

BALBOA'S DISCOVERY OF THE PACIFIC A.D. 1513

PANAMA-PACIFIC INTERNATIONAL EXPOSITION

PANAMA-CALIFORNIA

SOUVENIR

1915

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PANAMA CANAL

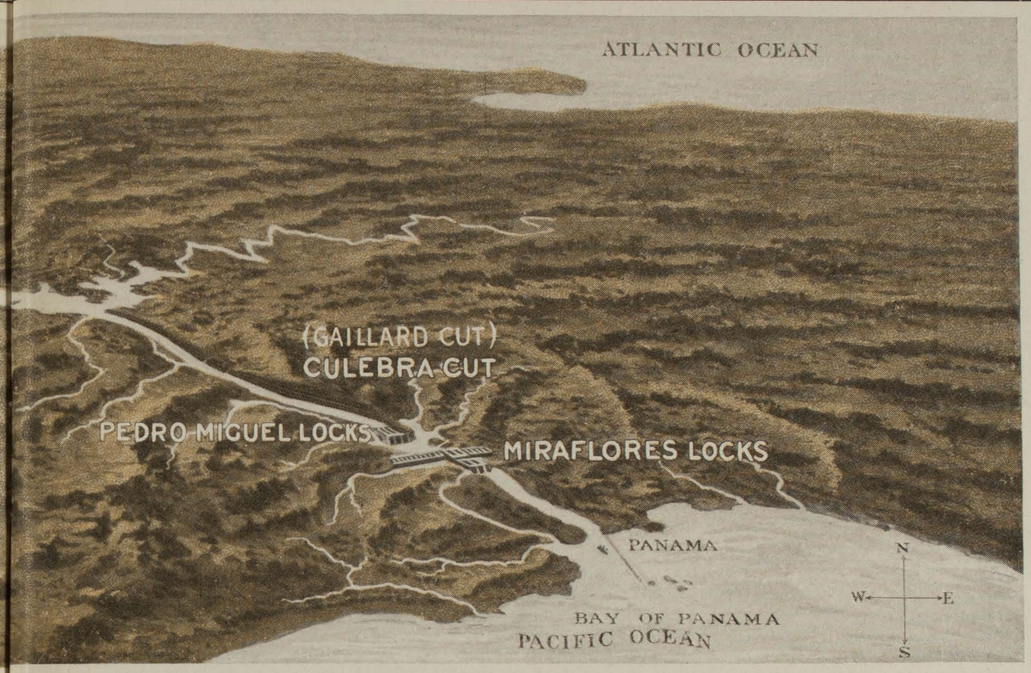
PANAMA-PACIFIC INTERNATIONAL AND PANAMA-CALIFORNIA EXPOSITIONS

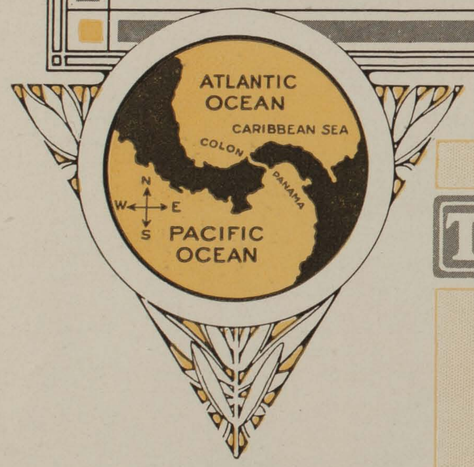


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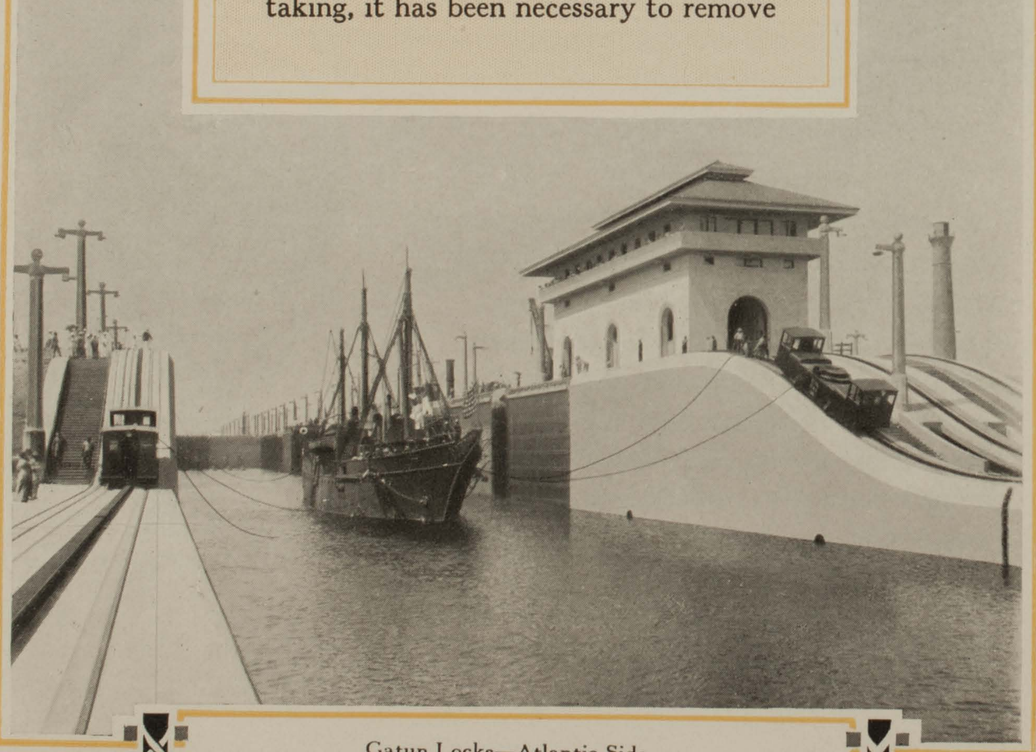
THE PANAMA CANAL

THE completion of the Panama Canal, an event of world importance and the greatest physical accomplishment in history, is the realization of a world-dream that has existed since the days of the Spanish Main. As early as the sixteenth century, Cortez saw what an immense advantage would be gained by cutting a canal through the Isthmus of Panama and made the suggestion to the King of Spain. The King, however, was a prudent monarch, and refused to undertake the work, fearing that it would bankrupt his treasury. It has, therefore, remained for the United States Government to accomplish this gigantic task almost four hundred years later.



Work on the Panama Canal was begun by a French company in 1882 and continued until 1889 when the company went into bankruptcy and operations were suspended. The new Panama Canal Company was organized in 1894, and work was continued on a small scale until 1899.

In 1902 the President of the United States was empowered by act of Congress to purchase from the Panama Canal Company all its rights and properties. Ten years have been required to complete the work after its acquirement by the United States. In order to complete this tremendous undertaking, it has been necessary to remove

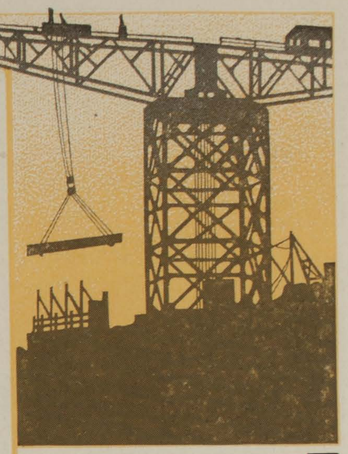


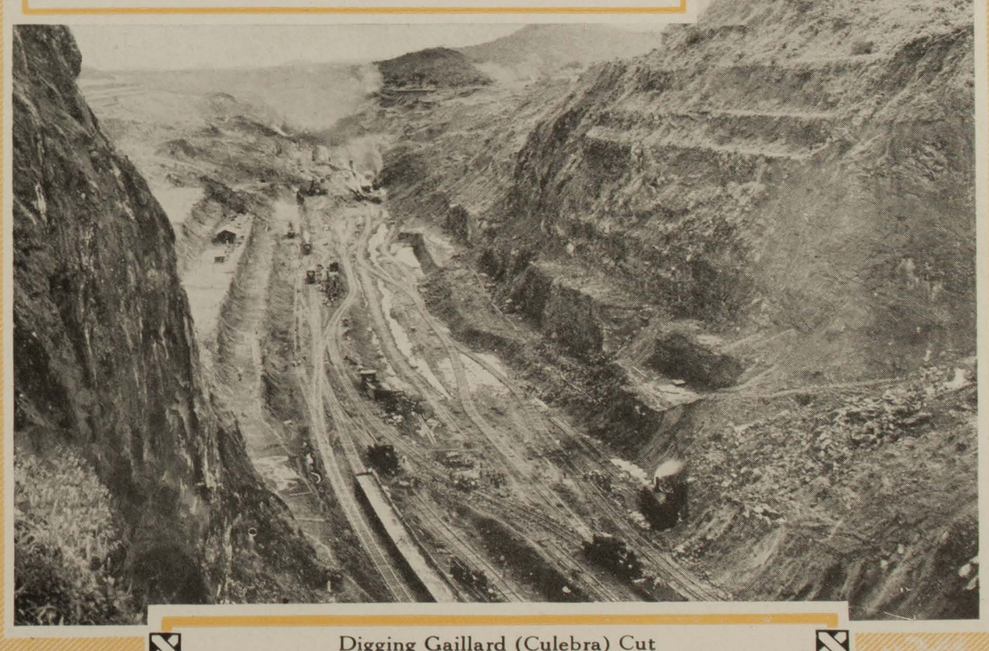
Gatun Locks—Atlantic Side

more than 200,000,000 cubic feet of earth and rock, and 6,000,000 pounds of dynamite were used annually in Gaillard Cut alone for blasting purposes. The complete expenditure on the Canal to date is approximately $375,000,000.

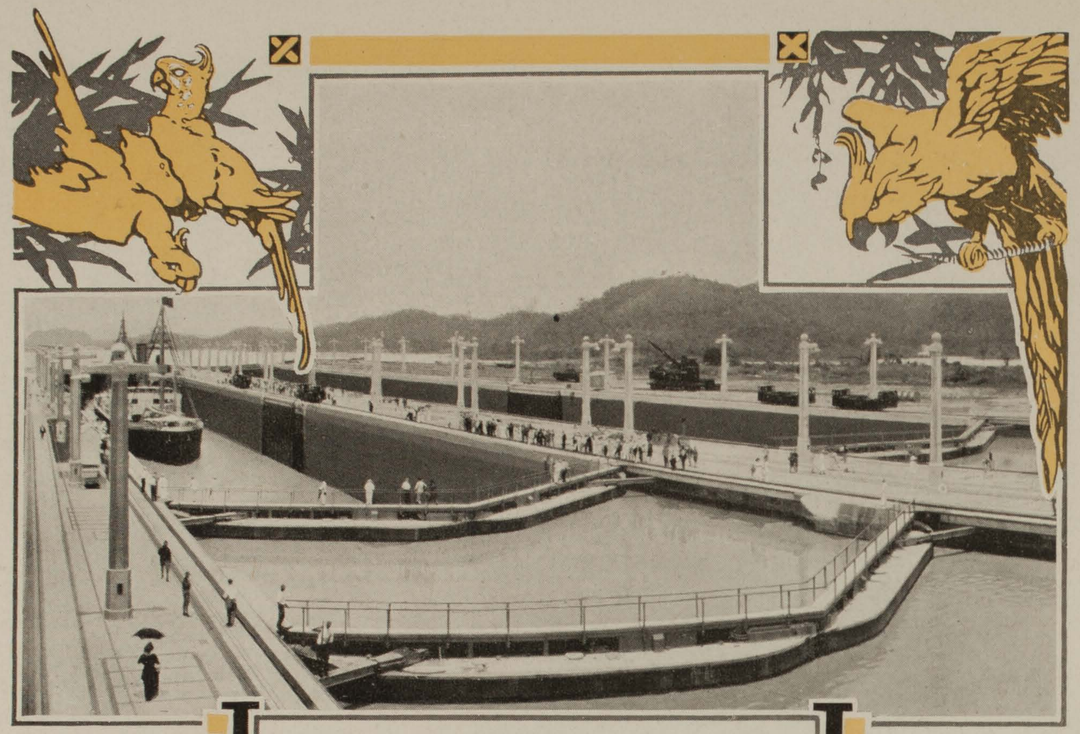
The sea route between New York and San Francisco has been shortened from 13,135 nautical miles around Cape Horn to 5,262 miles by means of the Panama Canal. The time saved by a freight steamer of 12-knot speed is about twenty-seven days.

The Canal extends from the city of Colon, on the Caribbean Sea, in a southeasterly direction to the city of Panama





Digging Gaillard (Culebra) Cut



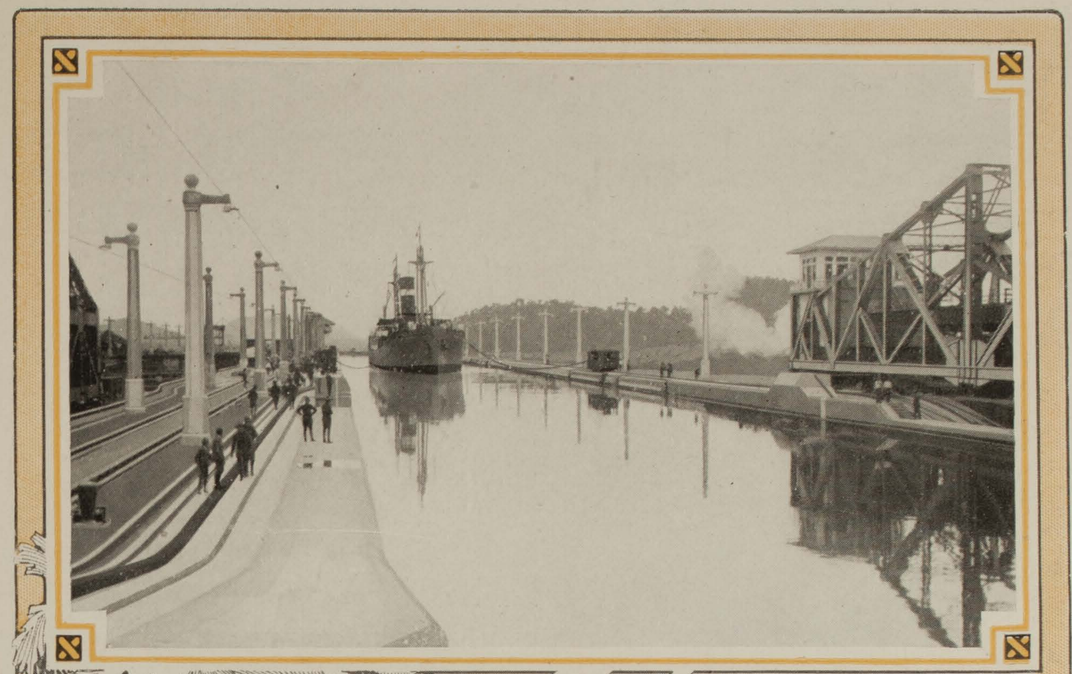
Pedro Miguel Locks

on the Pacific Coast. The distance, along the route of the Canal, is fifty miles, including the sea level entrance to the channels.

An erroneous impression widely prevails as to the geographical location of the Canal. On first thought, it would seem that the Canal would extend from east to west, across the Isthmus of Panama; however, by referring to the map, it is plain that the entrance from the Atlantic side is farther west than the entrance on the Pacific side. As a result it is possible to see the sun rise over the Pacific from the city of Panama, and see the sun set over the Caribbean Sea at the city of Colon.

From the Atlantic side to the Gatun locks the Canal is seven miles long and 500 feet wide. At Gatun, an 85-foot lake level is obtained by an enormous dam, and the vessels in passing from the sea level to the level of the lake do so through a series of three adjoining locks, each with a lift of 28⅓ feet.

This great Gatun Dam forms an immense lake known as the Gatun



Miraflores Locks—Pacific Side

Lake, and forces water through the Gaillard Cut. The Gaillard Cut is a channel, about nine miles long, through the hills of the Continental Divide.

At Pedro Miguel on the Pacific side, thirty-two miles from the Gatun Dam, the waters of Gatun Lake are stemmed by another dam, which permits the lowering of vessels into Miraflores Lake. This lake is fifty-five feet above the main level of the Pacific Ocean. At the other end of this lake, a mile-and-a-half from Pedro Miguel, are located the Miraflores locks. These locks are built in two lifts, and through them the vessels reach the sea level on the Pacific side.

Undoubtedly the Panama Canal will stand as the greatest engineering feat of the Twentieth Century. Its completion has dwarfed all previous triumphs of engineering skill, not only in magnitude but in the efficiency maintained throughout the years of persevering endeavor. Its effect upon the world's transportation will be revolutionary. At the present time we can only conjecture as to the influence it will have on the established routes of commerce that have been used for centuries.

PANAMA PACIFIC
INTERNATIONAL EXPOSITION



THE Panama-Pacific International Exposition is a national undertaking determined upon by Congress and authorized by the President of the United States. San Francisco, California, was selected as the site for this world's celebration to commemorate the completion of the Panama Canal.



The location selected for the Exposition grounds is an ideal one. The site occupies 635 acres of land on the northern shore line of the peninsula of San Francisco, and possesses peculiar beauty and many advantages. The abruptly rising ground on three sides forms a natural amphitheatre and provides shelter from the winds and fogs of the Pacific. The waters of San Francisco Bay are on the north at the very foundation of the Exposition buildings.

A more perfect location can hardly be imagined. It is within three miles of the business center and shopping district, reached by ferry or electric car, and easily accessible by water. This is

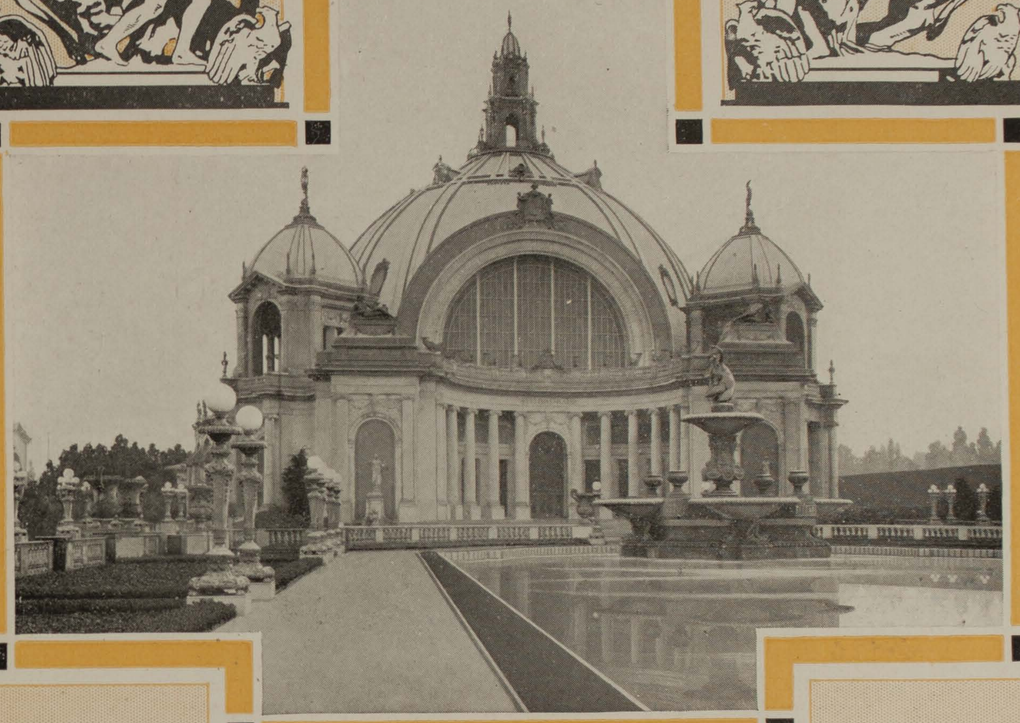


Group on Triumphal Arch—Nations of the West



Arch of the Rising Sun—
Nations of the East

Festival Hall



of immense advantage, as exhibits from all parts of the world were landed in perfect condition at the very gates of the Exposition, eliminating the necessity of much handling or reshipping.

Entering the exposition grounds from the city side, the visitor finds himself in the great garden, 3,000 feet in length, on the right extremity of which can be seen the beautiful Festival Hall. On the sloping hillsides to the west are located the pavilions of foreign nations. The various State Buildings are located along the shore, while to the west are the live-stock buildings, race tracks, aviation field, and drill grounds, where 10,000 troops may be seen on review. To the east of the Exhibition Palaces is the 65-acre tract entirely occupied by amusement concessions and called "The Zone."

A very distinguishing feature wherein the Panama-Pacific Interna-



Tower of Jewels

tional Exposition differs from prior expositions is in the compact arrangement of the buildings without being crowded. This contributes greatly to the pleasure and comfort of sight-seers.

The main Exhibition Palaces, eleven in number, are compactly built and conveniently connected by courts. Eight of these buildings are grouped in a rectangle, four fronting the harbor to the north and four to the south, separated by connecting avenues and courts. In the center is the Court of the Universe, containing a sunken garden to seat 7,000 people. To the east, at the crossing of the avenues, is located the Court of Abundance. To the west of the Court of the Universe is the Court of Four Seasons, illustrating the progress of the west. One can walk through these eight palaces from end to end without stepping from under cover.

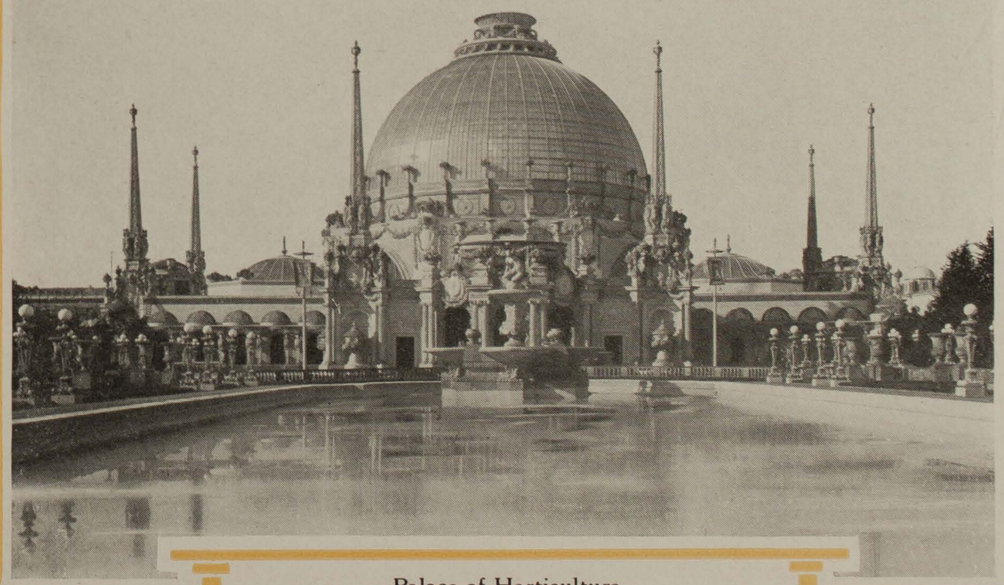


In this group of eleven Exhibition Palaces are housed examples of the resources and achievements along all lines of human endeavor during the past decade, representing the following great activities of mankind: Fine Arts, Education, Social Economy, Liberal Arts, Manufactures and Varied Industries, Machinery, Transportation, Food Products, Horticulture, Mines, Metallurgy, and Agriculture.

In the Palace of Agriculture is found the most complete and comprehensive array of exhibits pertaining to present-day methods of scientific management of the farm.

The International Harvester exhibit is located in the Palace of





Palace of Horticulture



Court of the Four Seasons

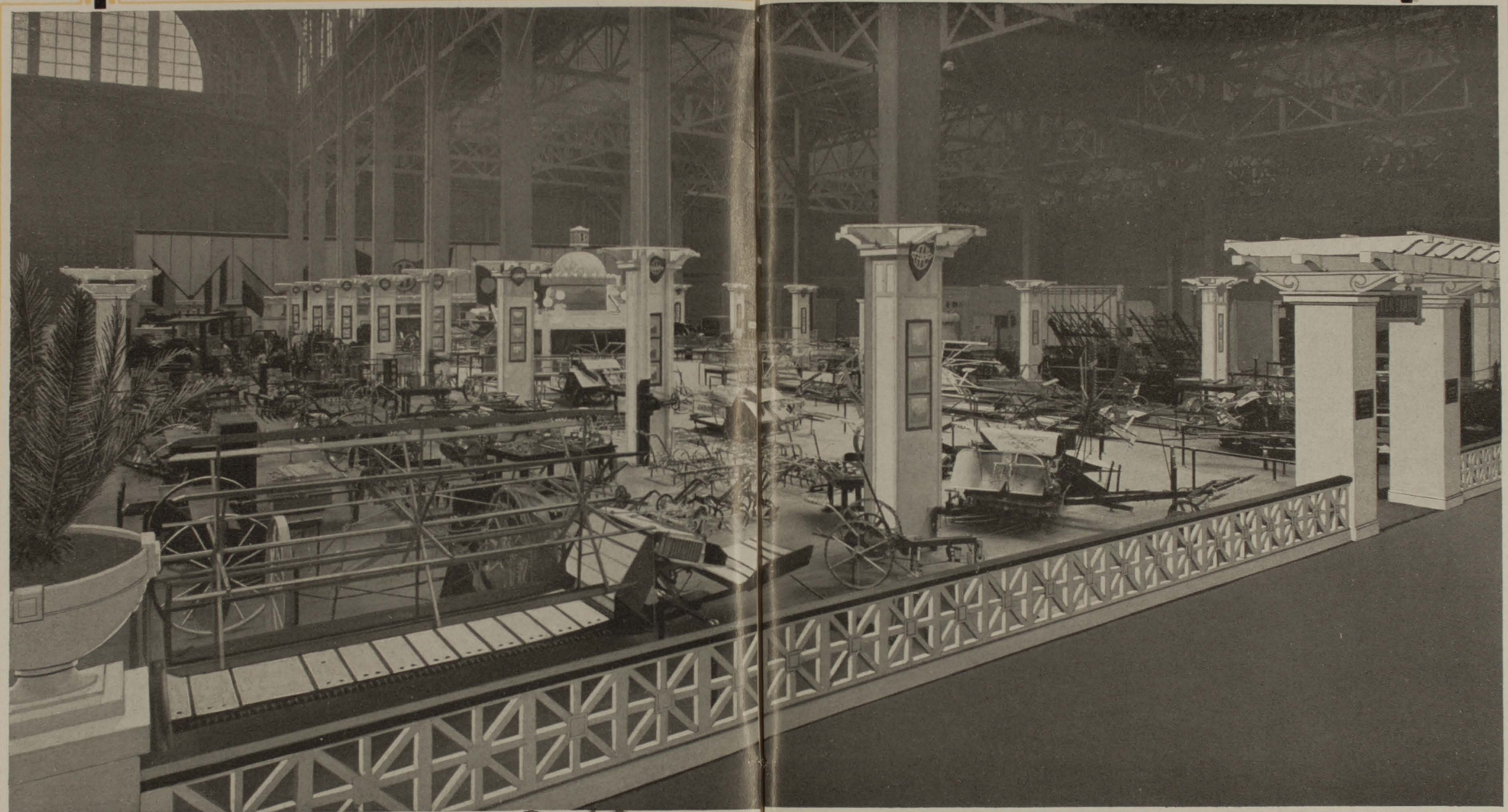
Agriculture, and comprises one of the most complete exhibits of modern agricultural machines ever assembled under one roof. No expense has been spared to make this display as complete, comprehensive, and educational in its nature as possible. It is the final example of the standing in the commercial world of the American farm machine industry.

The central part of the International Harvester exhibit represents in miniature four views of a complete model farm depicting farm activities during the four seasons. Each season occupies one-fourth of the centerpiece. This panorama is proportioned to an exact scale, giving the appearance of a real farm. The

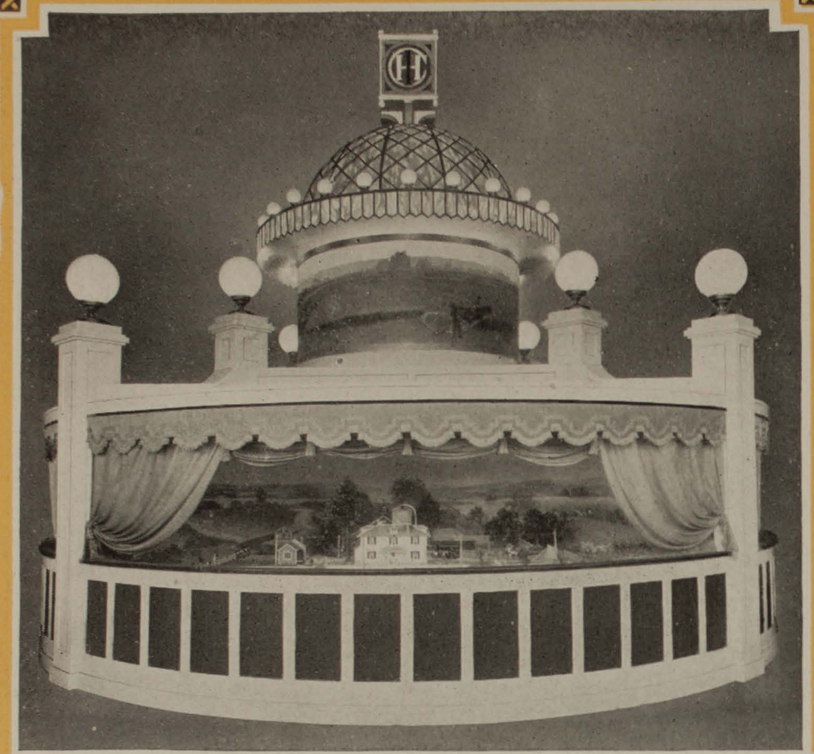
model is circular in form, surmounted by a cylinder and a dome capped by an electric I H C trade-mark. The upper part of the structure revolves and shows, in allegorical style, the four primary inventions of the first one-third of the nineteenth century. These are the steamboat of 1807, the locomotive of 1814, the reaper of 1831, and the telegraph of 1835. These pictures are peculiarly interesting in that they illustrate the forerunners of our modern steamboats, locomotives, farm machines and telegraph apparatus, and mark the first steps of this country toward its goal of industrial leadership.



Palace of Agriculture



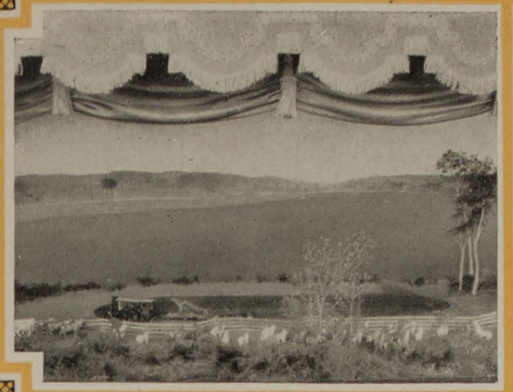
International Harvester
Exhibit
Palace of Agriculture
(Covers 26,600 Square Feet)



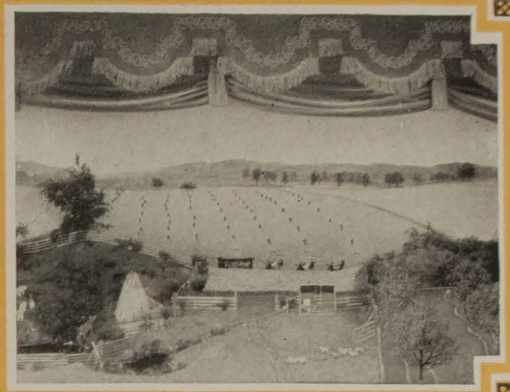
Centerpiece I H C Exhibit—The Model Farm

The entire representation is of one farm; each quarter represents a different view of this same farm, and the buildings, trees, etc., are the same wherever they appear.

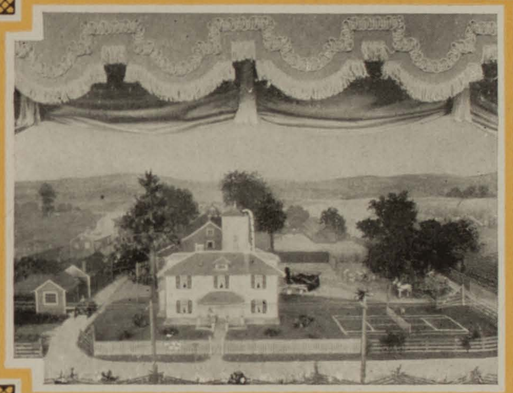
In the spring view is seen an International Harvester oil tractor drawing a gang plow and a tractor disk harrow, preparing the soil for planting and doing all the work in one operation. In the second scene, the same oil tractor and five International Harvester grain binders are cutting a swath of grain forty feet wide at the rate of ten acres per hour. The autumn scene includes a splendid front view of the farm buildings. Here an International Motor Truck is in constant operation carrying the products of the dairy to market. In the middle of the foreground is the oil tractor furnishing power for an International ensilage cutter. The fourth scene shows the farm buildings during the winter. This scene has two changes—day and night. This scene shows clearly how power on the farm has



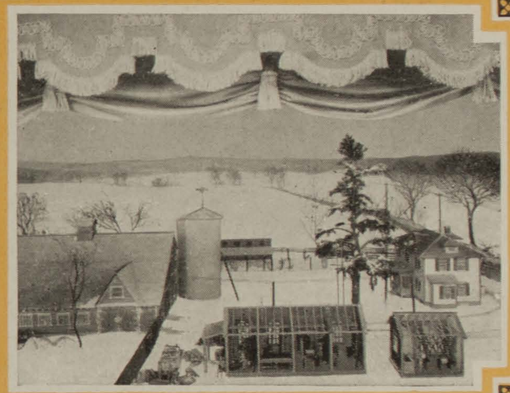
Spring Scene—
The Model Farm Centerpiece



Summer Scene—
The Model Farm Centerpiece



Autumn Scene—
The Model Farm Centerpiece

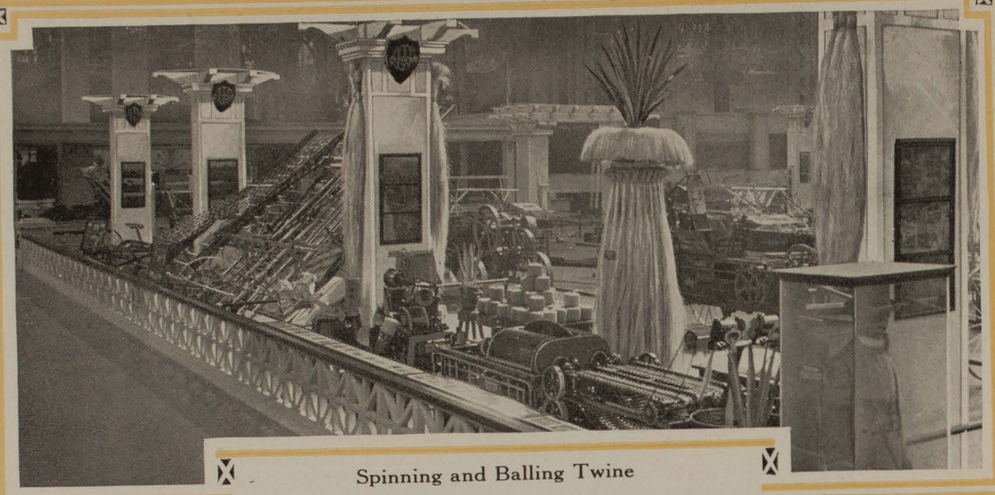


Winter Scene—
The Model Farm Centerpiece

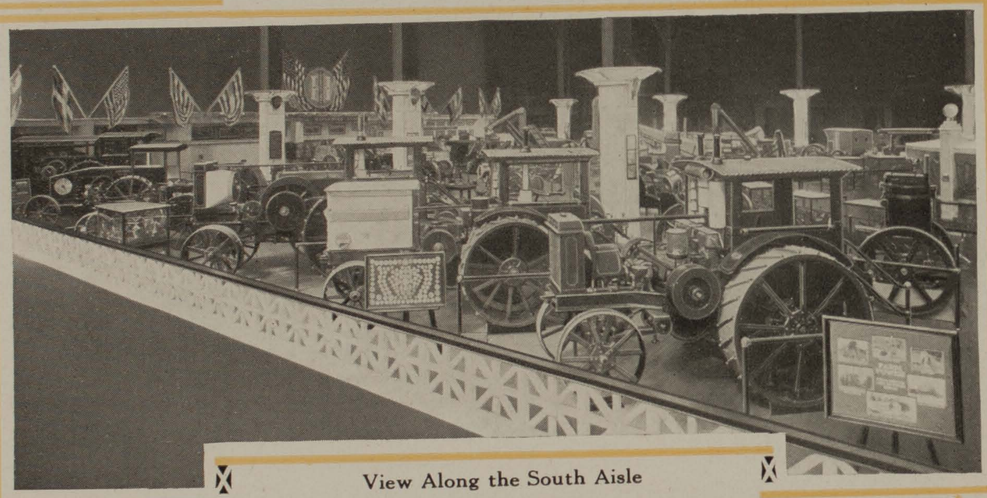
changed the winter life, not only for the farmer, but for his entire family.

Four aisles lead up to the panorama and divide the International Harvester farm machine exhibit into four sections. In these four sections of the exhibit will be found a complete collection of I H C hay, grain and corn harvesting machines, seeding machines, tillage implements, corn planters, ensilage cutters, feed grinders, threshers, manure spreaders, cream separators, farm wagons and trucks, oil engines and tractors, motor trucks, and some spinning and balling machines that are in constant operation making binder twine.

The greater part of the machines in the exhibit are in motion;

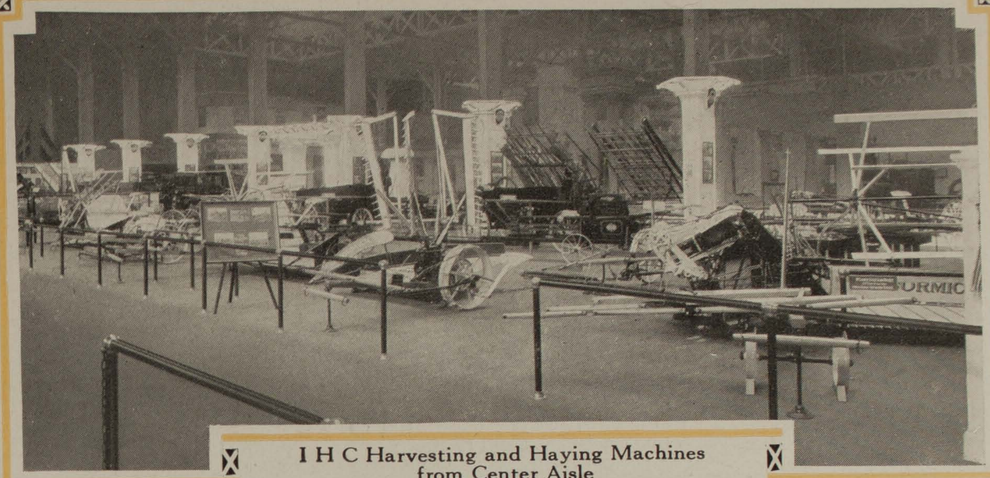


Spinning and Balling Twine

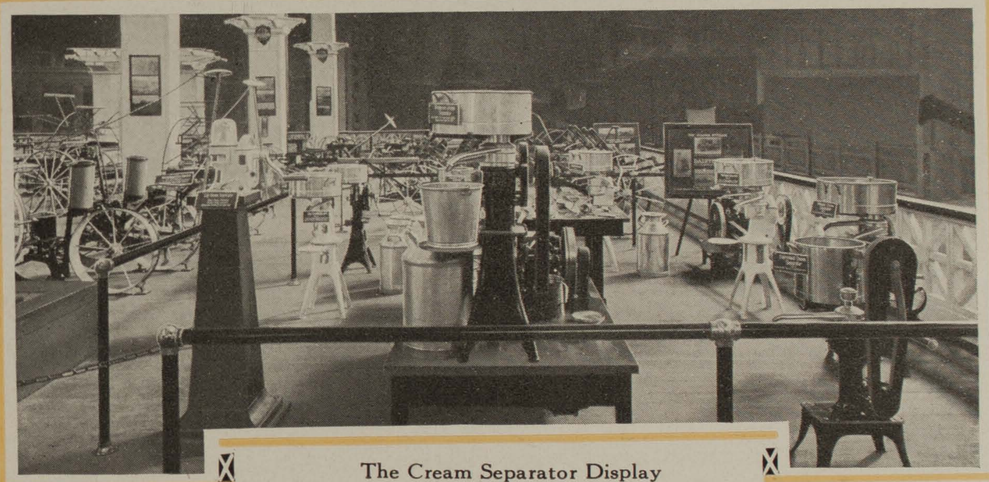


View Along the South Aisle

each machine in operation being connected to an individual electric motor through reducing gears which run in oil, making all operations as noiseless as possible. The oil engines are operated by compressed air, giving the impression of being operated by their natural fuel without the noise that would result from such a large number grouped together. A manure spreader is in actual operation, spreading pieces of leather, in place of manure, upon a canvas belt. A cream separator is being operated by an oil engine, producing an endless flow of milk and cream. Many of the machines are equipped with



I H C Harvesting and Haying Machines
from Center Aisle



The Cream Separator Display

glass parts and electric lights so that all the working mechanisms may be seen performing their respective duties just as they do in actual operation.

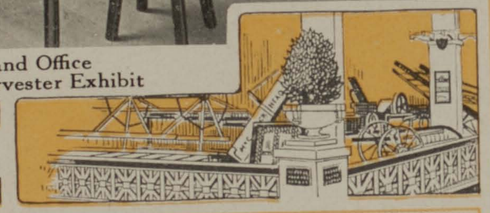
The west side of the building adjoining the exhibit is given over to a public rest-room, which is maintained for the comfort and convenience of the visitors to the International Harvester exhibit.

To the right of this rest-room is a space given over to the Agricultural Extension Department, and to the left of the rest-room is a space devoted to welfare work. In both these departments will be found an elaborate collection of charts covering every phase of





Rest Room and Office
International Harvester Exhibit

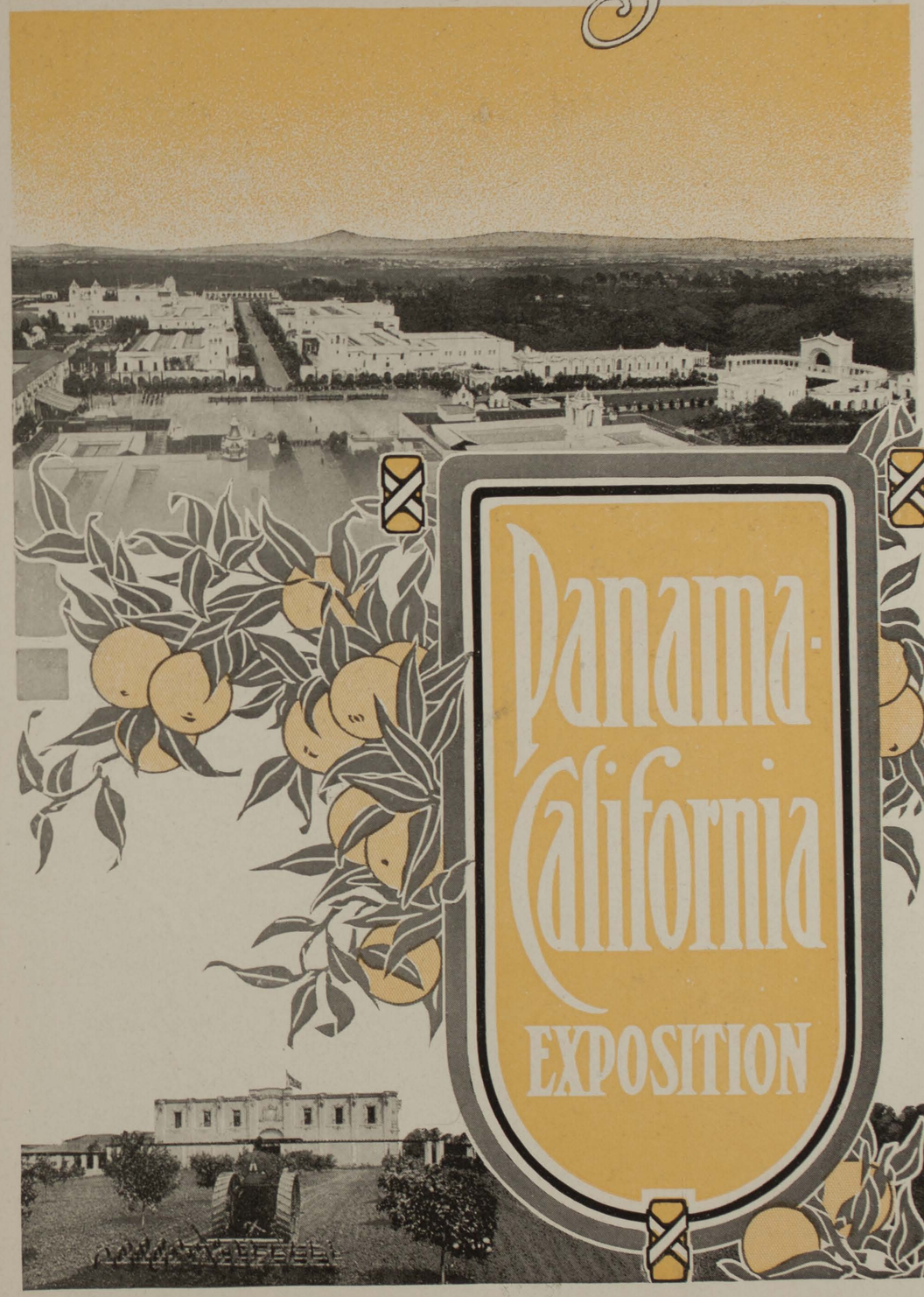


Agricultural Extension and welfare work. The Agricultural Extension charts illustrate the advantages of high-grade and tested seed, the value of leguminous crops, crop rotation and the benefits derived therefrom. The charts on welfare work illustrate what is being done at the various International Harvester plants to safeguard the health and life of employes by the installation of modern sanitation and safety appliances.

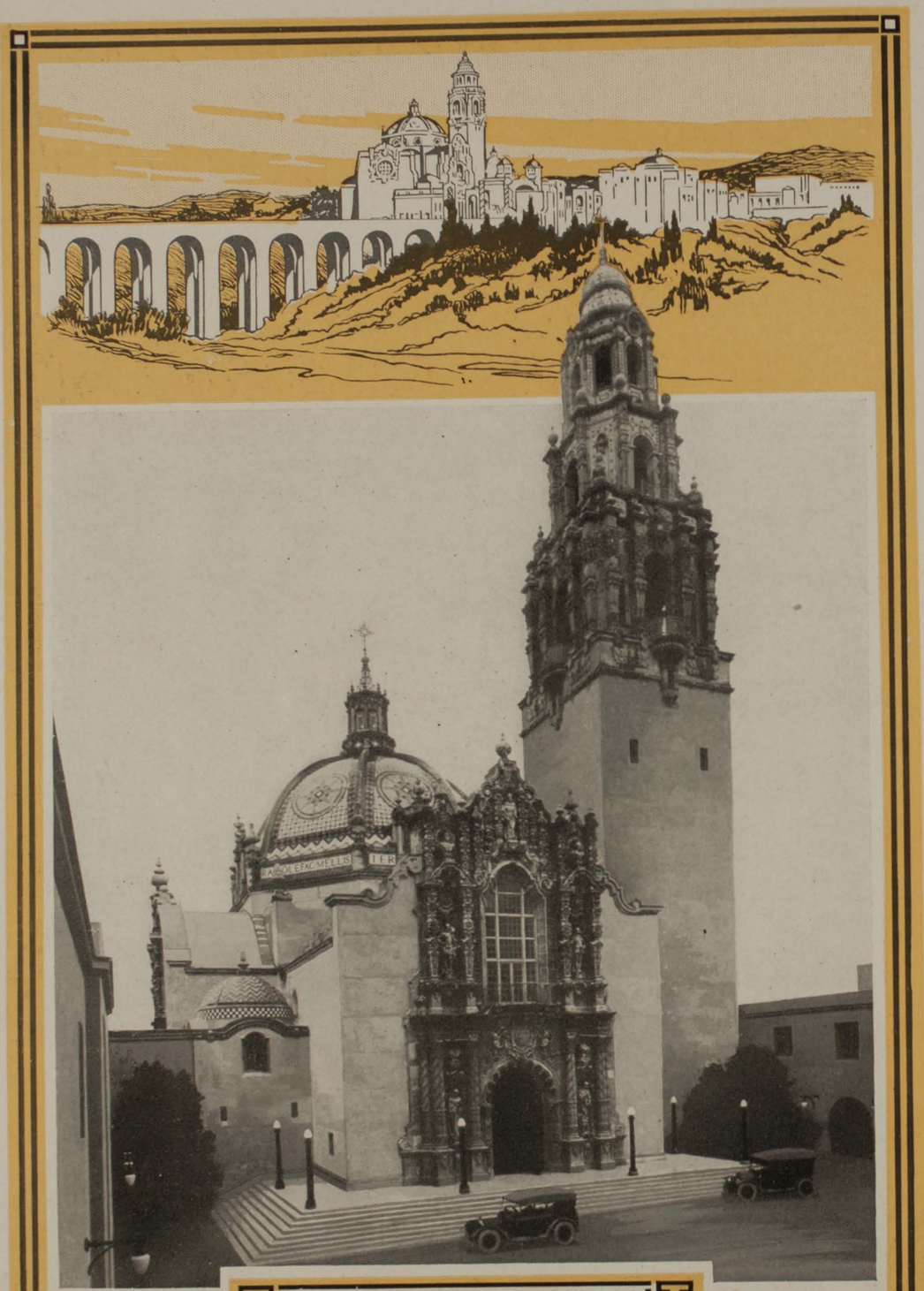
Scattered throughout the exhibit will be found a complete collection of charts covering every phase of scientific farm management.

A study of all of these charts is well worth the time required, not only to those interested in the modern farm and subjects pertaining thereto, but to all those who take an interest in the welfare work, pensions, and safety appliances in factories.

San Diego



Panama-California EXPOSITION



California Building



Southern Counties of California Building

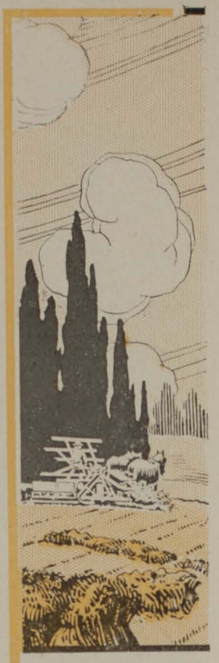
The object of the Panama-California Exposition at San Diego is so dissimilar from the object of the Panama-Pacific International Exposition at San Francisco, that the two Fairs are more correlative than competitive.

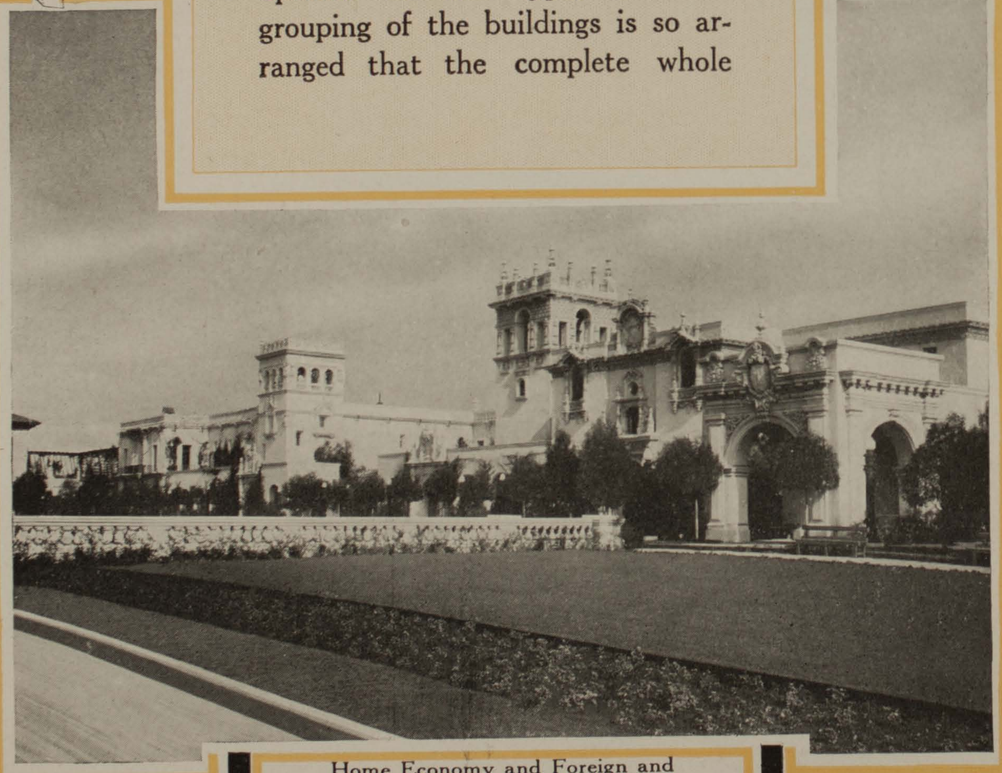
The San Diego Exposition is of a more demonstrative nature—the objective purpose being chiefly to build up the great Southwest area. It is a serious purpose, and one of genuine economic interest, devoted to progress and opportunity, specializing on education, immigration, irrigation, conservation, reclamation, re-forestation, commerce, horticulture and agriculture, presenting the history of man and the evolution of his arts and sciences.



Balboa Park, the site of the Panama-California Exposition, is a 1,400-acre tract of rolling hills, canyons and gently sloping mesas in the heart of the city of San Diego, within twelve minutes' walk from the business center. The grounds selected are ample, and possess the distinction of originality in all salient features. They are on an elevation 300 feet above sea level, and overlook Point Loma, the Bay of San Diego, and the Pacific Ocean, comprising a magnificent view.

The architecture is all of the Spanish Colonial type, and the grouping of the buildings is so arranged that the complete whole





Home Economy and Foreign and Domestic Arts Buildings



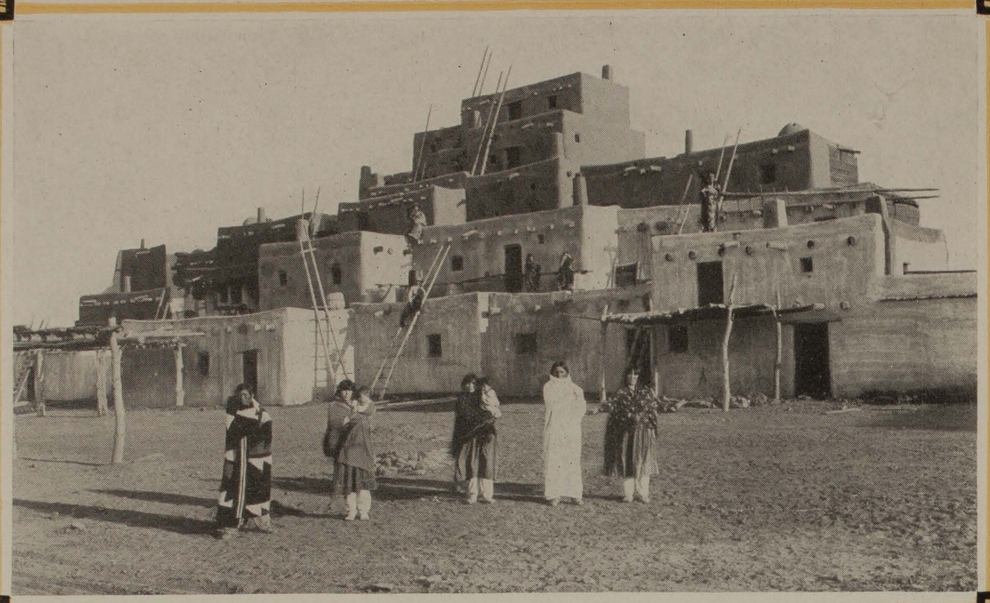
Science and Education Building

resembles a picturesque medieval city amid tropical verdure.

Most of the $7,000,000 expended for this Exposition is a wise permanent investment in beautifying Balboa Park and contributing to its educational charm for all time. The principal buildings are so planned that they can be used for art galleries, auditoriums, and museums, for instructive collections after the close of the Fair.

The main entrance is approached by an imposing reinforced concrete bridge of seven arches spanning Cabrillo Canyon, 1,000 feet in length and 136 feet above an improvised sylvan lake, which ends at the West Portal.

From the West Portal the Prado, or main avenue, extends east, many of the buildings being grouped on the heights near Cabrillo Canyon. The California State Building stands immediately within the grounds, and connected with it by an imposing arch spanning the Prado, forming the principal entrance, is



Pueblo Indian Village



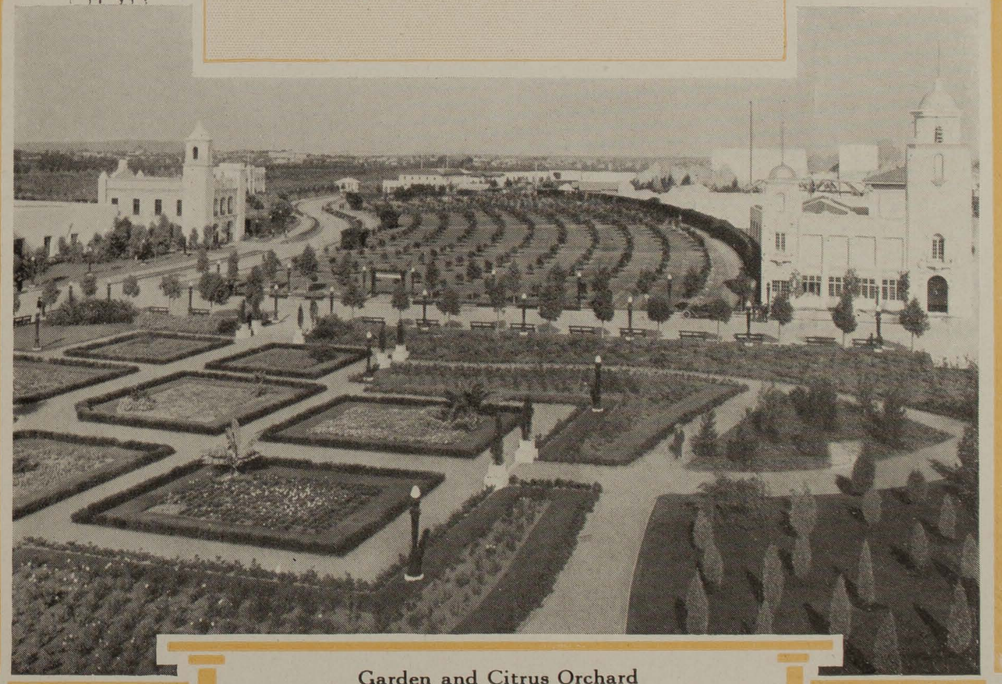
the Ethnological Building, wherein is housed the splendid exhibit of the Smithsonian Institute.

Southern California Counties, Home Science, Arts and Crafts, Science and Education, and Agriculture are the other main buildings, which afford a comprehensive idea of the exhibits outside of the principal attraction, which is horticulture and all botanic growths.

The slopes of the canyons at the Exposition grounds are filled with giant palms and ferns. Acacias in all varieties, tall eucalyptus, grevilleas, peppers, firs, cypress and other ornamental trees are assembled from all corners of the world. A five-acre grove of oranges is so

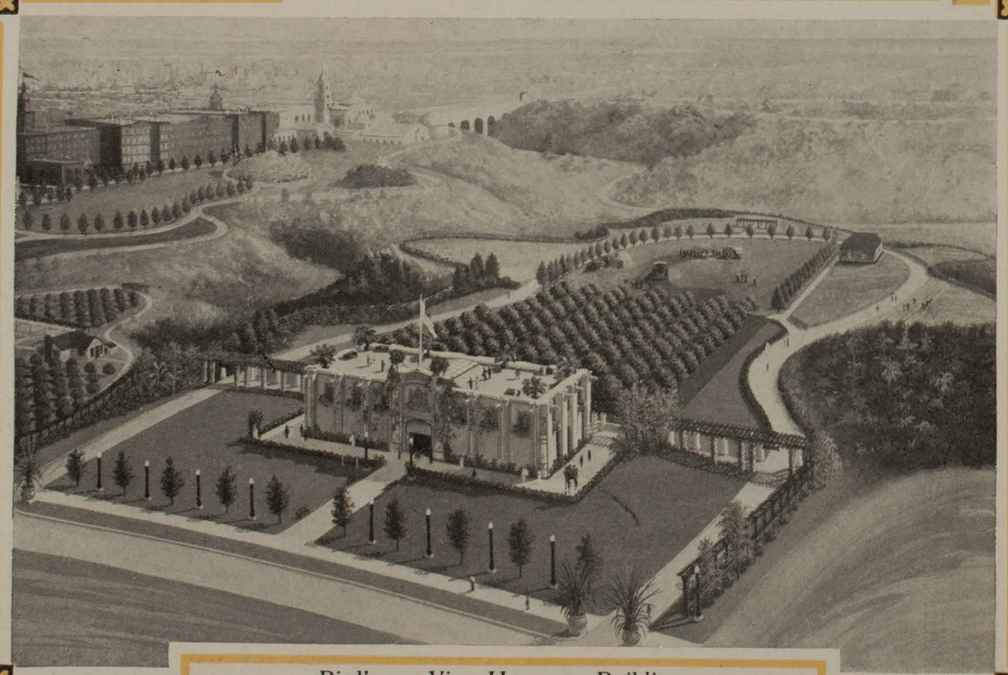
cultivated that a portion is in bud, another in bloom and others in every stage of growth, including the ripened fruit, at all times. Groves of lemons, pomegranates and all California fruit-bearing trees are also found. In one section are seven hundred of the finest citrus trees that could be found in all Southern California. Nearby are groves of deciduous trees and gardens and berry vines of endless variety, forming in all a complete exemplification of the economic trees and other growths, not only of the Pacific Coast, but of distant lands.

In keeping with the architecture and the purpose of this Exposition, the magnificent International Har-



Garden and Citrus Orchard

vester exhibit is of a demonstrative nature, which is supplemented by an indoor display housed in a building erected for this purpose. The International Harvester exhibit fully typifies the advanced standing of the American farmer as a class. It covers an area of five acres, where, in addition to the magnificent building of Spanish Colonial architecture, is found a growing citrus orchard, a complete irrigation system in operation, and a full array of agricultural machines in actual operation. The citrus orchard is bearing fruit after having been planted, cultivated, sprayed, and generally developed along the most accepted methods of irrigation. The water is raised by an oil



Bird's-eye View Harvester Building and Grounds

engine attached to a centrifugal pump, and is delivered to the orchard through concrete pipes and hydrants. The orchard is disked and cultivated with an orchard tractor, and the fertilizer is applied with a manure spreader through the same motive power. A spraying outfit operated by an oil engine and drawn by a small tractor is also in use.

Beyond the orchard is a large demonstration field in which plowing is done and where power farm machines are operated by engines of various sizes.

Both the orchard and demonstration field are interspersed with shade trees, through which pleasant paths wind in and out. Rustic benches and settees line these walks, giving an attractive and restful atmosphere to the grounds.

The entire roof of the building is given over to a picturesque roof garden, which permits an excellent view of the Exposition Grounds and particularly of the International Harvester outdoor exhibit.



Harvester Building and Pergola



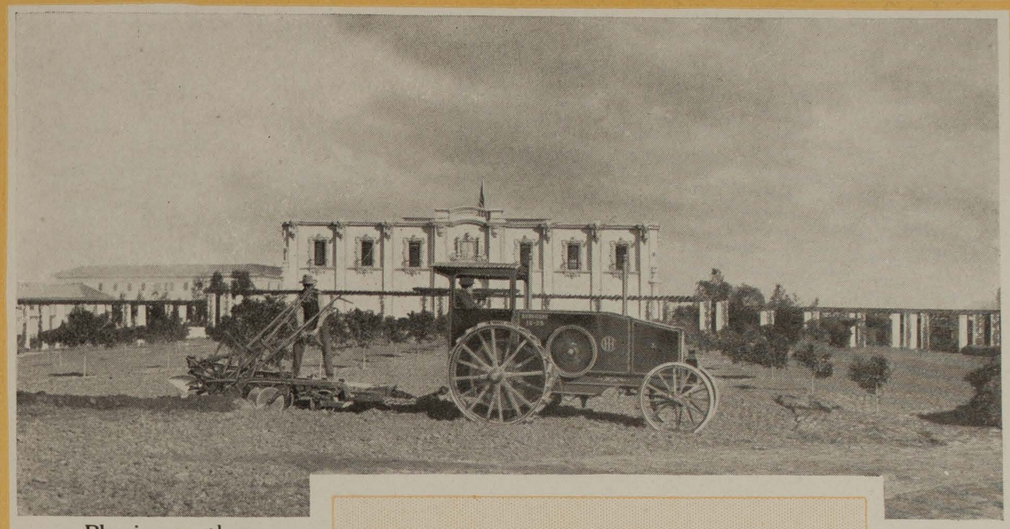
Interior View of Harvester Building

In the International Harvester Building on a balcony from which the main exhibit can be seen is a commodious rest room. This rest room, as well as the roof garden, is set aside for the comfort and convenience of the thousands of sightseers who will at some time during the year visit the International Harvester exhibit.

On the main floor of the building is the machine exhibit proper. Here are displayed many of the latest models of farm



Rest Room and Office on Balcony



Plowing on the I H C Demonstration Field

machines. A 50-H.P. Mogul oil engine is in constant operation, furnishing the light and power to run the compressed-air plant and the electric motors which are attached to the individual machines that are in operation. A large number of these machines are in operation, and many of them are further equipped with glass sides and electric lights, so that the working mechanisms may be seen while in actual operation. To anyone not familiar with present day farm equipment, the ingenious arrangement of contrivances brought together in this five-acre tract is a revelation. To those who know and are familiar with such things, its scope and mastery of detail will excite admiration.



Ancient Reaping Hook
Used for Forty Centuries



Ancient Reaper Used by
Gauls—First Century



Harvesting with the Scythe
During the Eighteenth Century

The International Harvester exhibit is open to visitors the entire year of 1915.

The machines shown in the International Harvester exhibits at San Francisco and San Diego contrast strangely with the implements that have been in vogue for centuries in planting, tilling and harvesting crops. The wonderful advance in farm equipment has been made within the last few decades. The reaping hook and the cradle are implements used within the memory of many men now living. It seems strange that these primitive implements continued to be the best means of harvesting until near the middle of the nineteenth century.

Pliny tells of a reaping machine used in Gaul with which a slave and one ox could harvest a large acreage in a day.

The machine is described as a large box-like cart with teeth for driving through the standing grain so that the heads were torn off and fell within the box. At best very little is known of this machine. It soon fell into disuse and the reaping hook and the cradle were the only successful implements for harvesting grain for forty centuries.

It is within the last century that the first successful reaper was invented. In the early part of the nineteenth century several inventors attempted to perfect machines that would replace the cradle and the reaping hook. Nothing practical was developed until the year 1831 when Cyrus H. McCormick built his first reaper. Since that time, a large number of machines have been invented, some of them



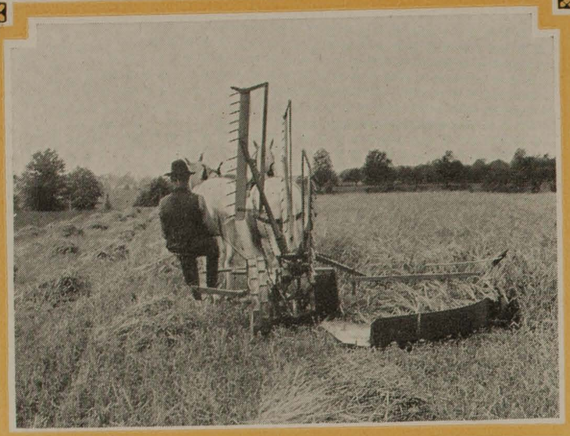
The Cradle—1800



The First Successful Reaper—1831



Self-Rake Reaper—1858



Modern Reaper



Marsh Harvester—1855



Modern Twine Binder

never having passed the experimental stage. Others were pronounced a success from the start and have been improved to such an extent that they are now the modern self-binders, reapers and headers.

The underlying principles of the early machines that were successful are the same as those to-day, that is, the reciprocating sickle, reel and platform. The motive power was oxen or horses, hitched either at the side and front, or behind, and the grain was forced to the sickle by the reel, was cut and dropped to the platform. A man, walking alongside of the platform, removed the grain with a rake as soon as enough had accumulated for a gavel.

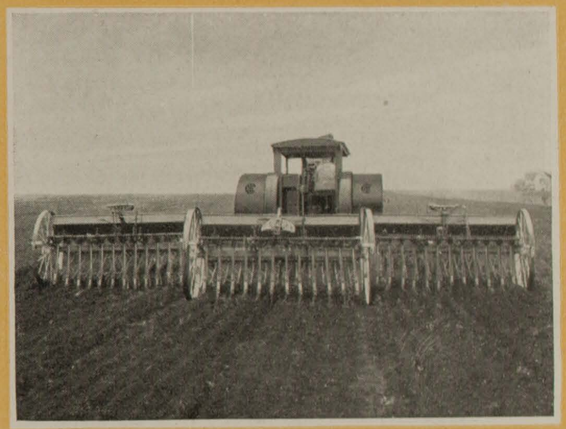
The great difficulty encountered by the pioneer reaper inventor was the sickle. Many different devices were tried, but nothing equalled the reciprocating knife. The next improvement on the first practical reaper was the addition of a seat for the man who raked the grain. Several years later a self-rake was added, which eliminated the extra man. The reaper to-day is built largely along these lines.

Work on a harvester, which preceded the modern self-binder dates back to the year 1855, when experiments were tried with machines which elevated the grain to a platform where it was bound by two men. These machines were not successful, however, owing to the prejudices of farmers against anything but a reaper, and to the poor construction of the machines themselves.

Harvesters of this type were used to some extent until 1877, when the automatic wire



Plowing and Harrowing with Oil Tractor Power



Seeding with Grain Drills and Oil Tractor



Harvesting a 40-ft. Swath with 5 Binders and Oil Tractor



Disk and Spring Tooth Harrows



Peg Tooth Harrow



Planting Corn with Check Row Planter

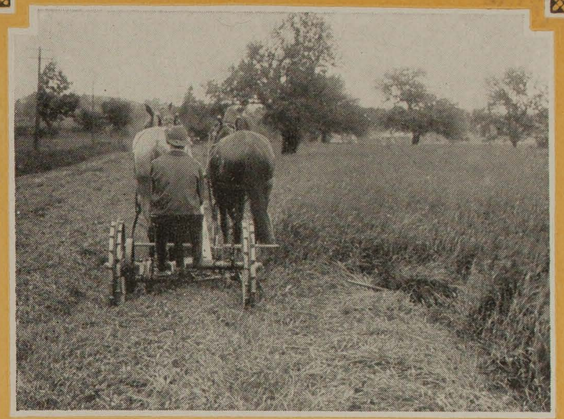
binder was substituted for the two men. A few years later, the twine binder superseded the wire-tying binder, and improvements have been added from time to time until now the modern self-binder is essentially a structure of iron and steel, a marvel of simplicity and efficiency.

At the time of the invention of the reaper the farmers were eking out an existence by hand methods on small farms. The amount of grain a man could raise depended entirely upon how much he could harvest. The larger the family, the more he could harvest by hand and the greater amount of grain it required to feed them. Therefore, the limitation of the farmer's harvest activities limited his social as well as his educational possibilities. Without the reaper no railroads

or other means of communication were necessary. Each little settlement was a community within itself wherein nearly all its simple wants were produced.

What a great change the reaper wrought — gradual to be sure, but nevertheless momentous. When the sturdy sons of agriculture realized that they had within their reach a means of increasing the profits of their labors, they began to push westward. More ground was needed so that they could have larger fields to harvest.

With farmers growing a surplus of grain, transportation systems began to develop, new railroads were built over the fertile prairies of the middle west. Farmers went westward by the thousands, taking with them their precious reapers. Towns sprang up, and



Mowing Hay



The Tedder Aids in Curing Hay



Raking Hay into Windrows



A Modern Haying Scene—
Mowers, Rakes and Stackers at Work



Side Delivery Hay Rake



Baling Hay with Motor Press

industry after industry was started.

Thus, the invention of the reaper was the beginning of prosperity not only for the farmer, but for the nation.

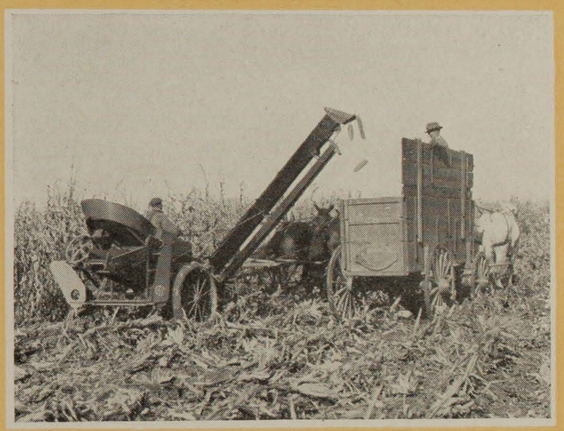
As soon as farmers saw that their labors were not limited and that they could harvest more grain than they could sow and care for, with the tillage and seeding implements they had at hand, the necessity for better plows, harrows and seeders was realized. The outgrowth of these needs was the making of better plows and the invention of spring and peg-tooth harrows, disk harrows, grain drills and seeders. With the possibilities for growing and harvesting more grain came the imperative demand for an efficient thresher, and the modern threshing machine is the outcome of this necessity.

The evolution in farm machinery was not confined to the machines for handling the small grain crops. Inventions of machines to facilitate the harvesting of hay and corn were just as numerous and brought about revolutionary methods in the raising of these crops.

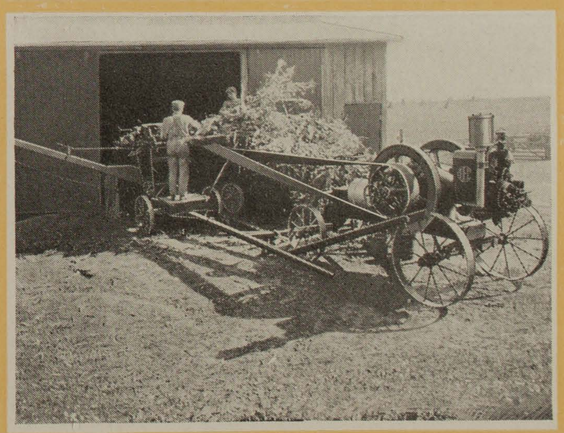
The invention of hay, grain and corn harvesting machines for the benefit of the farmer brought about a demand for more scientific management. The resources of the farm must be conserved by retaining the fertility of the soil, and to this end the manure spreader and cream separator were brought into use. The tilling of a modern farm has developed into a science. The farmers of the world are employing capital, energy and enterprise in their business of farming. Sys-



Corn Binder with Elevator Attachment



The Corn Picker Gathers the
Ears and Removes the Husks



Husking the Corn and Shredding the Stalks



Tractor and Ensilage Cutter
Filling a Silo



Wide Spread Manure Spreader



Quick Delivery with a Motor Truck

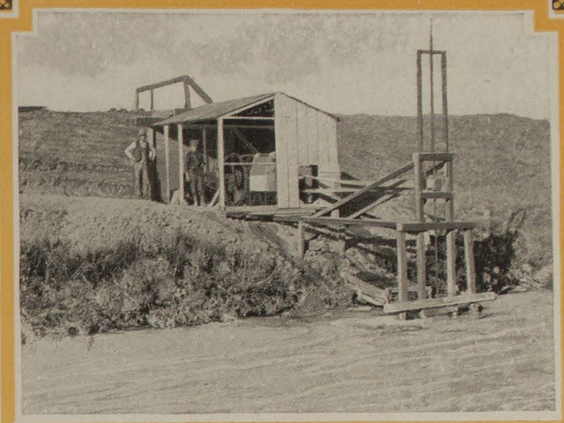
tematic practices are prevailing — crop rotation, soil fertility, and greater efficiency are more and more apparent.

All the various lines of farm machines have been improved to such an extent that the farmer is now practically dependent upon no one but himself. The cream separator has done away with the drudgery of the old-fashioned dairy and greatly increases the earnings of the dairy herd. The manure spreader greatly increases the fertilizing value of the manure. The hay press enables the farmer to put his hay in the most desirable form for shipping and storage. The oil engine furnishes the most economical power for all farm purposes. Oil tractors are fast replacing horses for plowing and heavy field work.

Motor trucks are used in hauling perishable farm products to market. The feed grinder and, in the corn belt, the corn sheller, the ensilage cutter and the husker and shredder are a part of the equipment of almost every modern farm.

Numerous inventions of all kinds for making the farm home and country life more desirable are constantly coming into use. Nearly every operation on the farm has been made less burdensome, and many methods of agriculture have been completely transformed. All these farm machines invented to benefit the farmer directly have also benefited the nation indirectly and have placed our entire social and economic life upon a higher plane.

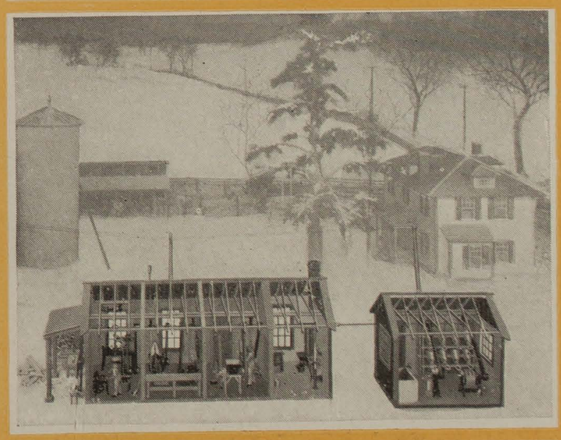
No one deserves greater credit for the



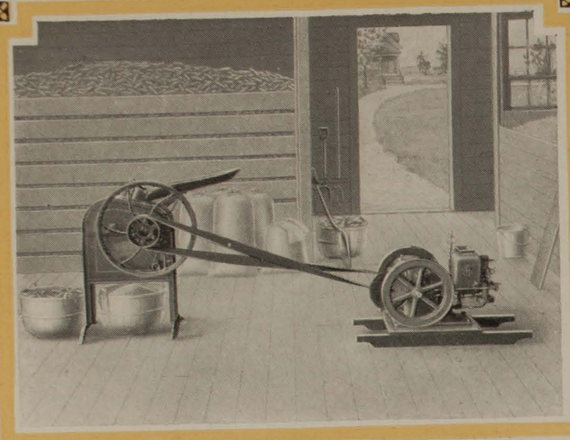
An Oil Engine Pumping Water for Irrigation



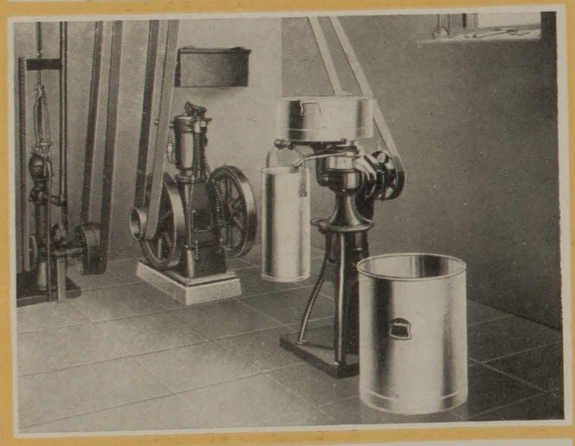
Power Sawing Outfit



Farm Power House



Small Power Corn Shelling Outfit



Up-to-date Dairy with Oil Engine and Cream Separator

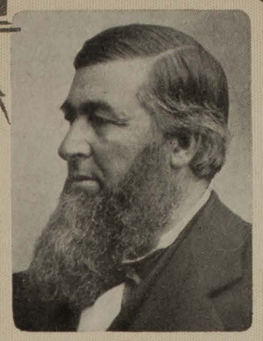


Spraying Outfit in Orchard

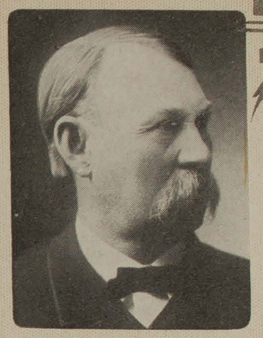
wonderful strides made by our country than the men who have given the work of their lives to the development of harvesting machines. The world owes them a debt of gratitude because their work resulted in cheaper bread.

The work of these pioneers of the harvesting machine industry made possible the building of big cities, the development of mines, and released a large number of people for pursuits in the commerce of the world.

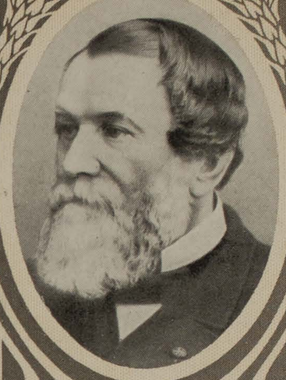
Efficient farm machinery is the medium that has permitted a large percentage of the population of this country to enter other lines of endeavor. No longer is the great majority obliged to do farm work in order that the people of the world may have enough to eat.



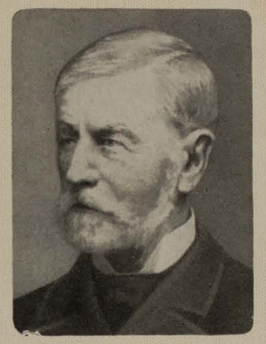
D. M. Osborne



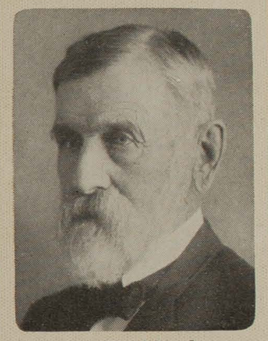
William N. Whitely



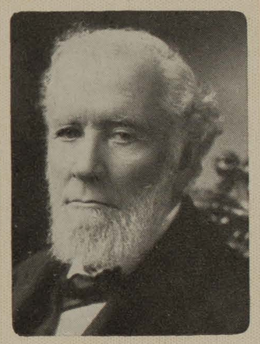
Cyrus H. McCormick



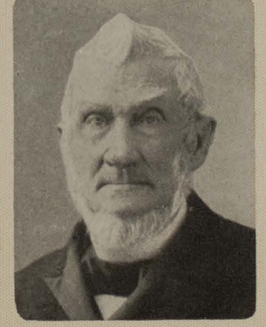
Walter A. Wood



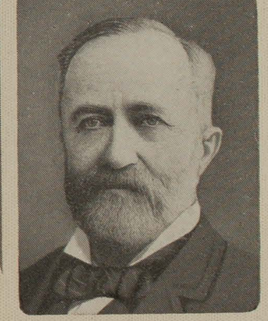
C. W. Marsh



William Deering

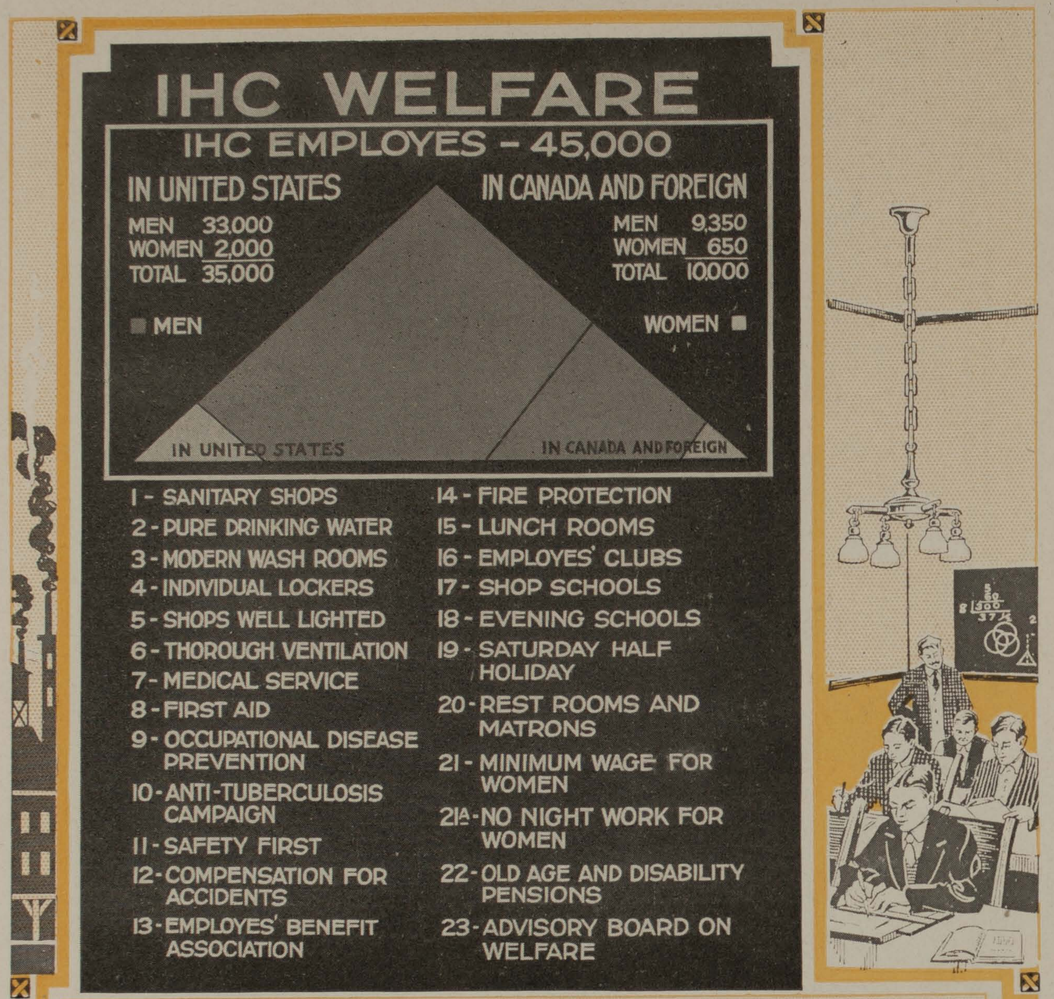


William H. Seymour



Byron E. Huntley

PIONEERS OF THE HARVESTING MACHINE INDUSTRY



Much attention has been devoted to matters affecting the working conditions, health and lives of the International Harvester employes. The scope of this work and its practical character are shown in the chart on this page.

The appropriation for welfare work is made in a spirit of justice and fair dealing. This spirit is an integral part of the International Harvester policy with employes.

Standards are adopted by the Advisory Board on Welfare, composed largely of Works Superintendents, and each Superintendent's responsibility extends to the welfare matters in the plant under his supervision.

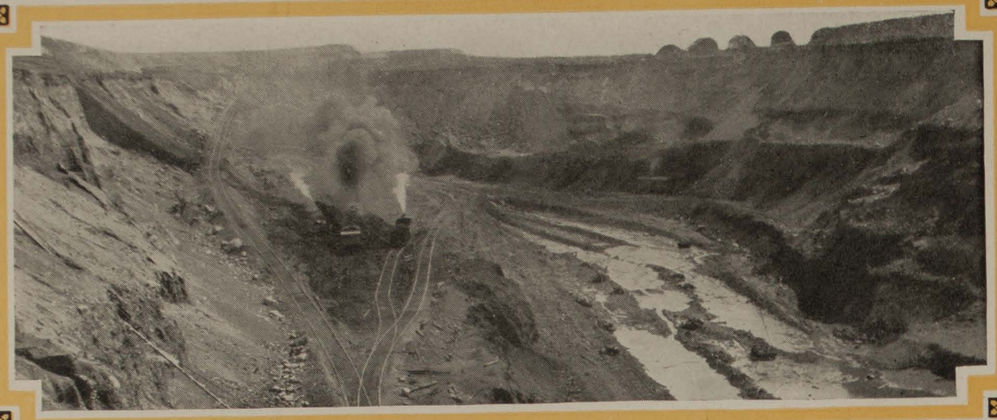


Not only is interest manifested in the welfare of International Harvester employes, but also in the welfare and progress of the farmer. With this end in view, an Agricultural Extension Department was organized. The purpose of this department is to bring to the farmer the most efficient methods and practices; to simplify and modernize scientific agriculture through co-operation and organization. This work is carried on, not only by the circulation of publications and agricultural bulletins, but by coming in direct contact with farmers through campaigns, by going to them where they live, in their homes, with the problems that most concern them.

During the years 1913 and 1914 the campaigns of the I H C Agricultural Extension Department have been carried on in twenty-five states. A staff of ten to thirty lecturers and organizers have taken an active part in the field work. Altogether forty-three campaigns have been put on; 5,157 meetings were held with a total attendance of 445,000, at which over three million pieces of agricultural educational literature were distributed. All of this field work has created wide-spread interest among the farmers. Many requests are coming in daily to the Agricultural Extension Department for assistance in carrying on campaigns along agricul-





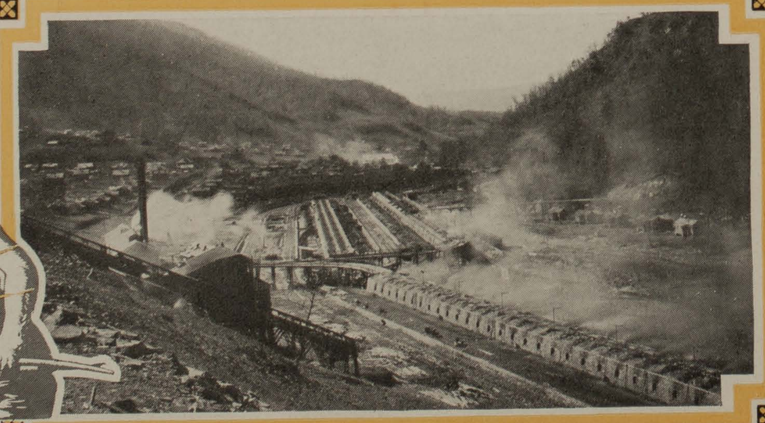


Agnew Iron Mine, Hibbing, Minn.

tural lines. In response, thousands of booklets, plans, and special articles have been sent out, and in many cases representatives have been sent to make personal investigations.

The great demand for modern farm machines has brought about the rapid development of this industry and necessitated the building of large manufacturing plants for producing these machines. With a million and a half I H C machines being manufactured annually in plants that cover an area of 775 acres and that give work to about 35,000 employes, it became necessary to provide for the future by insuring an adequate supply of raw materials that would be independent of the fluctuations of the market. Raw materials for I H C machines in the way of iron ore mines, coking coal lands, and timber lands have been provided for.

Coke Ovens
Benham, Ky.



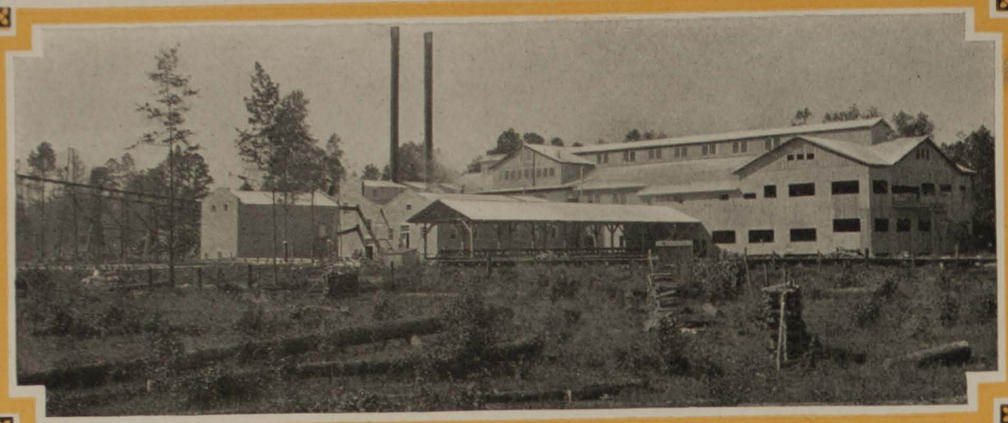


Making Pig Iron at the Steel Mills

Iron ore is secured from the Agnew and the Hawkins mines in the Mesaba range of Minnesota. From these mines the iron ore is transported in boats to the steel mills at South Chicago, Illinois, where it is unloaded by electric hoists. This plant, which supplies the requirements of the various I H C Works, consists of three blast furnaces with a capacity of 450,000 tons of pig iron annually. To make this amount of pig iron requires approximately 900,000 tons of ore, 450,000 tons of coke, and 300,000 tons of limestone. All of this material is unloaded and discharged into the furnaces mechanically. The iron ore is not touched by human hands from the time it is taken from the mines by steam shovels until it is handled by workmen in building modern farm machines.



The "Harvester"
Ore Boat



Saw Mill, Huttig, Mo.

A Bessemer converting mill is located near the blast furnaces. This mill converts the iron into steel.

The coke used in the steel mills and other I H C plants is all produced in the coke ovens at Benham, Kentucky, where 6,500 acres of coking coal lands provide a supply that will last indefinitely.

The I H C timber preserves consist of 80,000 acres of timber lands providing a source of supply in the way of lumber that is practically inexhaustible. On the I H C timber preserves the rules of the Government Forestry Department are strictly carried out. Every precaution is taken to save the smaller timber for future use. No trees less than twenty inches in diameter are cut. By the time the present available supply has become exhausted, the smaller timber will have attained the required dimensions.

Loading Logs for Huttig Saw Mill





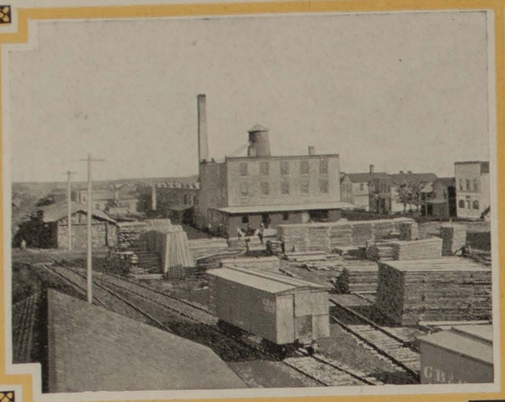
Combing Fibre at the Twine Mills

For the manufacture of binder twine a large supply of raw material is also required in the way of fibre. Sisal and Manila fibre are used, a large percentage being Sisal. Sisal is obtained from the henequin plant. Henequin is a tropical plant grown very extensively in Yucatan, Mexico, where it is cultivated in an up-to-date manner on large plantations. Manila fibre is obtained from a plant or tree that grows in the Philippine Islands. The fibre is shipped to the I H C warehouses in large bales, where it is carefully inspected and sorted before going to the Twine Mills.

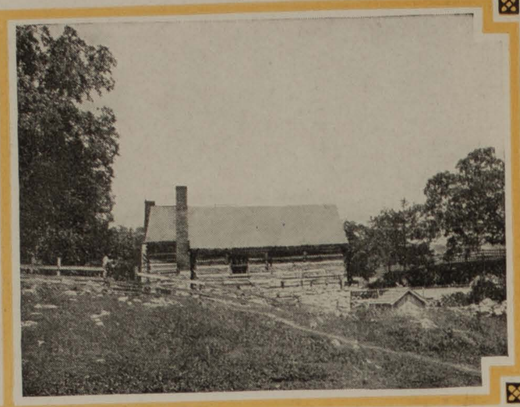
Over two hundred and fifty million pounds of I H C twine are used annually. This amount of twine is of sufficient length to reach between the earth and the moon one hundred and seven times.



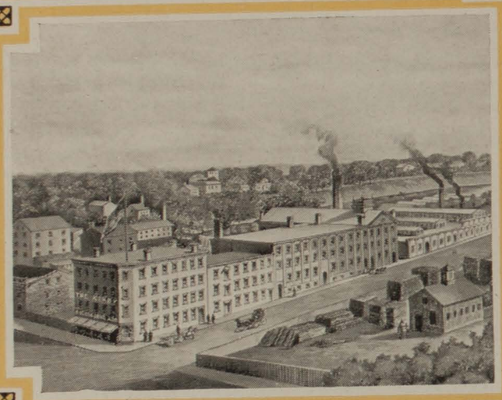
Balling Twine



Deering Works at
Plano, Ill.—1875



Smithy where the First McCormick
Reaper was Built—1831



The Osborne Works
in the Early Days



Champion Reaper and Mower
Works—1856

A clearer idea of the vast requirements of raw material for I H C machines may be had when it is noted that more than two hundred million feet of lumber are used annually in the construction of I H C machines. The I H C binder, reaper, and mower sections made annually, if placed side by side, and built into one huge sickle, would reach from San Francisco to Buffalo, N.Y. The canvas used in the manufacture of aprons for I H C binders, headers, header-binders, and stripper harvesters, if made into one apron of standard width, would reach from New York City to Dallas, Texas. To take care of the ramifications of a vast

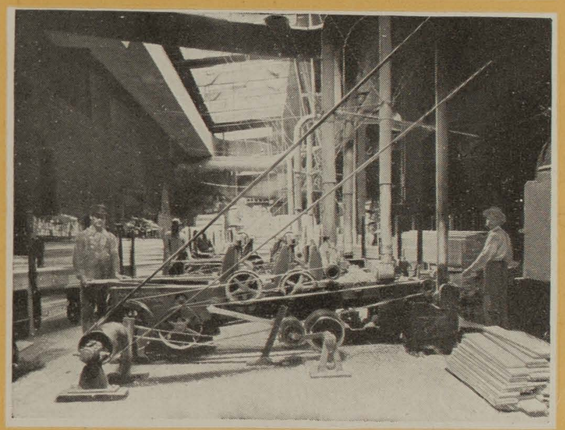
industry of this kind requires more than 45,000 employes, whose sole aim is to cater to the farmers of the world.

To describe in detail the particular work done on each machine at any one of the I H C plants would prove tedious. Every part and every operation is done by special machinery, and we will only briefly describe the main processes that are necessary in the production of a modern farm machine.

In each of the Works is to be found the experimental department, where the inventing, drafting and designing are done. This part of the plant is the birthplace of many agricultural machines and implements as well as of the more important improvements that have been made. The process of manufacturing begins in designing and building an experimental machine, which is sent out into the field to be



Casting Mower Wheels



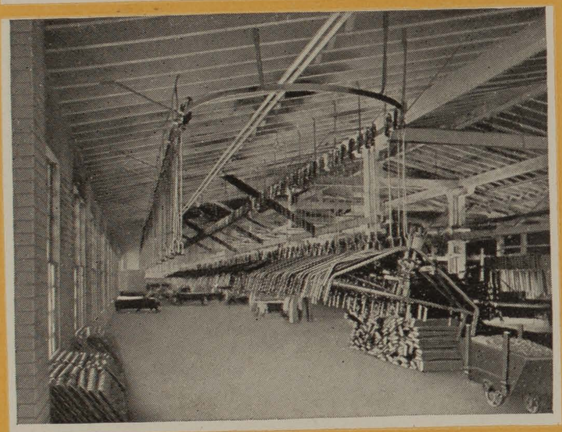
Planing in the Wood Shop



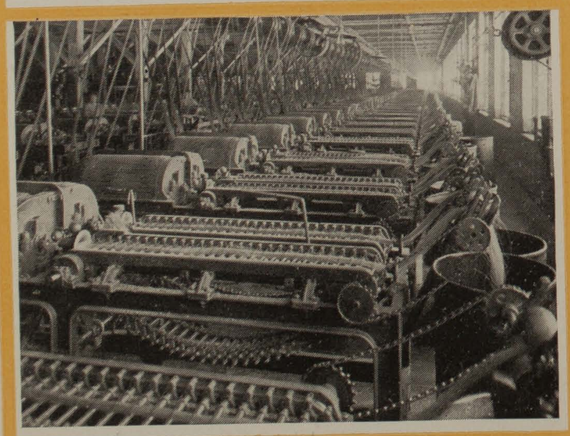
Assembling Room
in one of the Engine Works



Testing Binder Knotters



Trolley Conveyer in Paint Shop

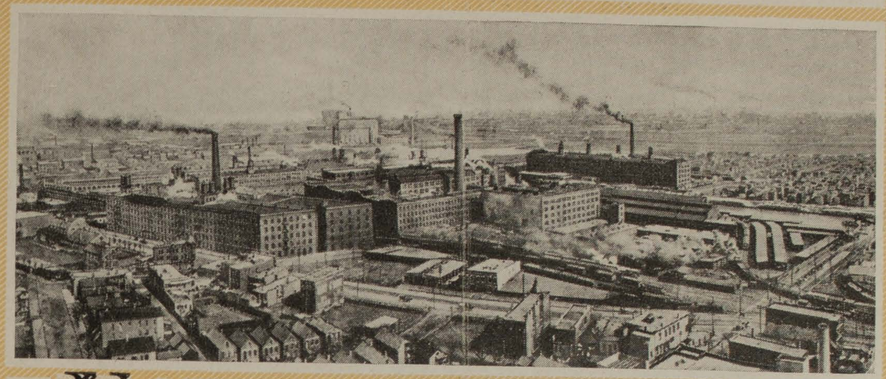


Spinning Machines in Twine Mill

tested. Re-designing and perfecting a machine oftentimes requires many months, and frequently years of actual test in the field.

In a line of farm machines there are several thousand separate parts that must be made and assembled. In many instances, each part goes through several distinct operations. When the various parts of the machine have been fitted, they are sent to the assembling rooms. Here they are assembled into their respective machines. One could spend a week in each of these great plants, studying the simple and automatic ways in which the complicated things are done.

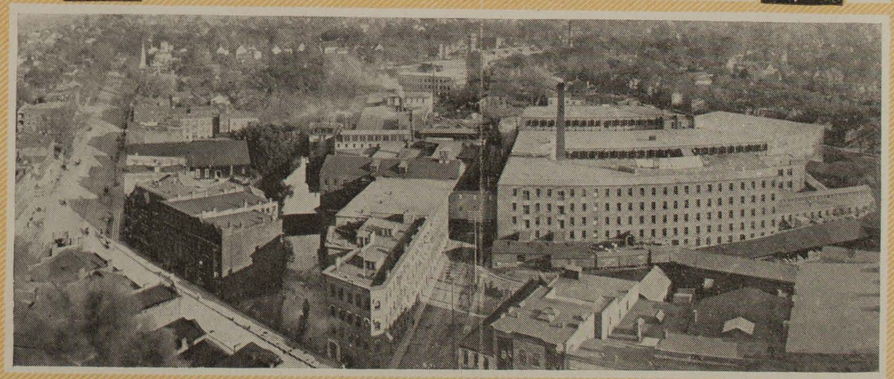
The illustrations presented herewith show the various activities and manufacturing plants in which International Harvester machines are produced. There are nineteen of these plants in all — twelve in the United States, three in Canada, and four in Europe.



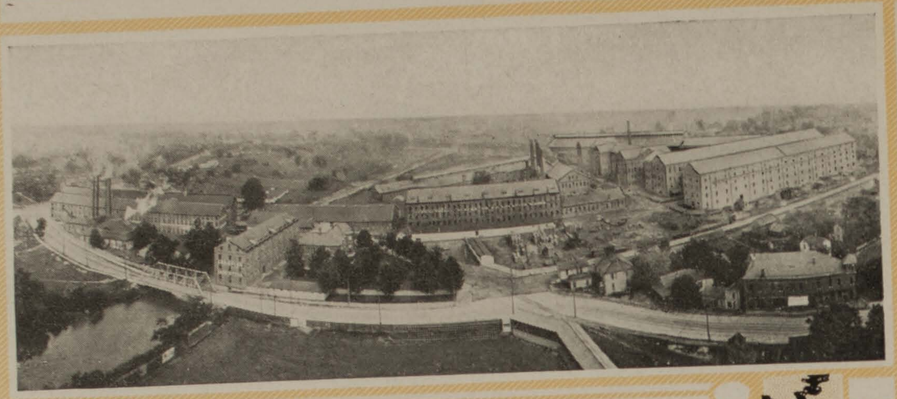
McCormick Works, Chicago, U S A



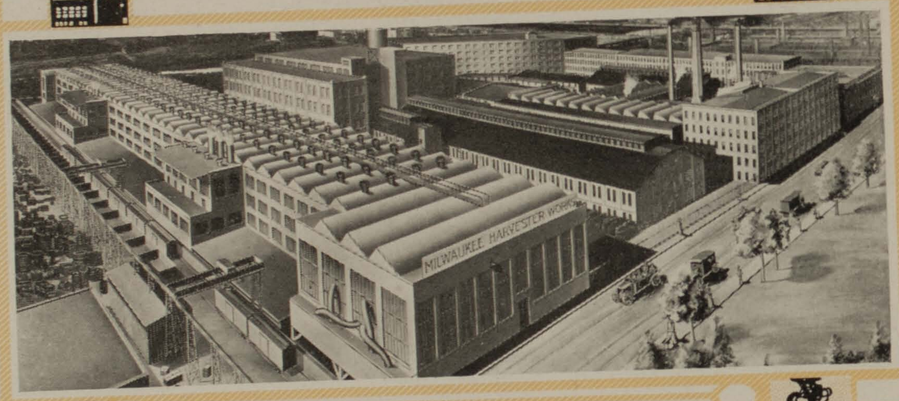
Deering Works, Chicago, U S A



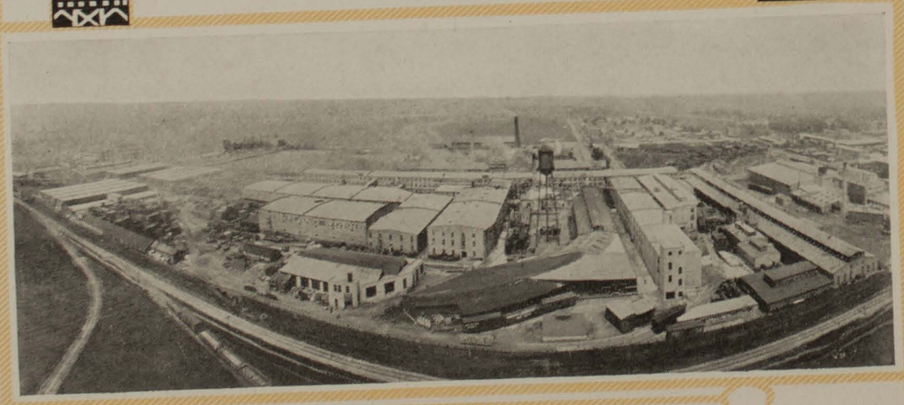
Osborne Works, Auburn, N. Y., U S A



Champion Works, Springfield, O., U S A



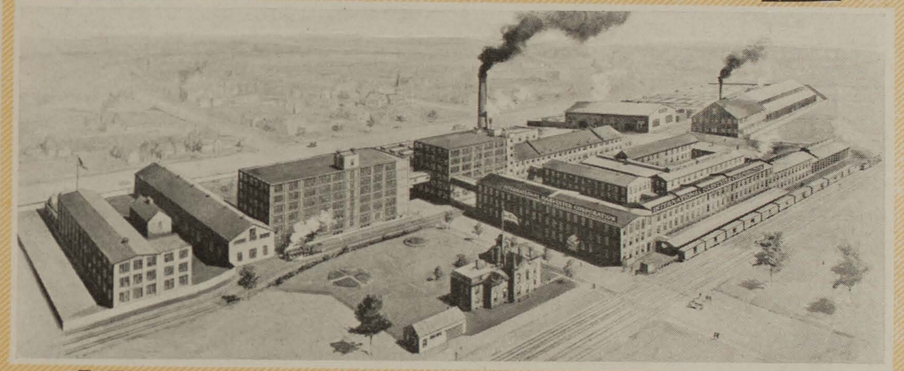
Milwaukee Works, Milwaukee, Wis., U S A



Plano Works, West Pullman, Ill., U S A



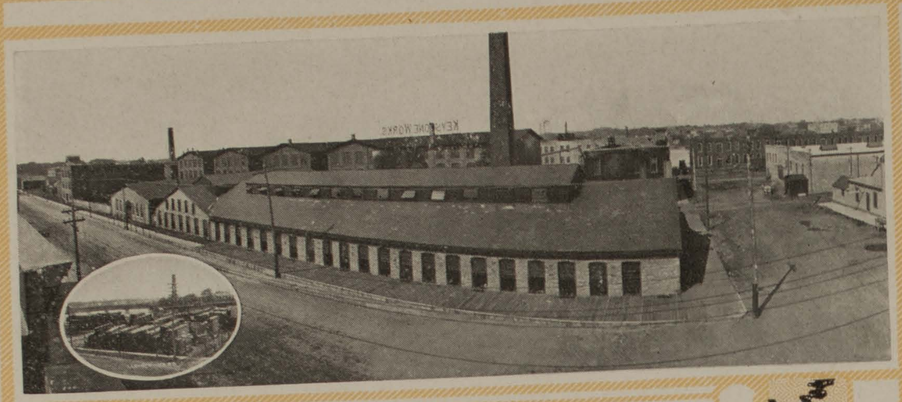
Weber Wagon Works, Chicago, U S A



Akron Motor Truck Works, Akron, O., U S A



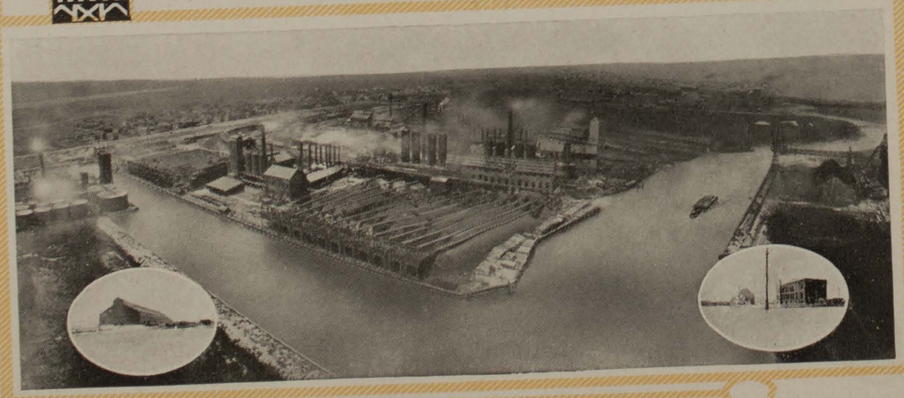
Tractor Works, Chicago, U S A



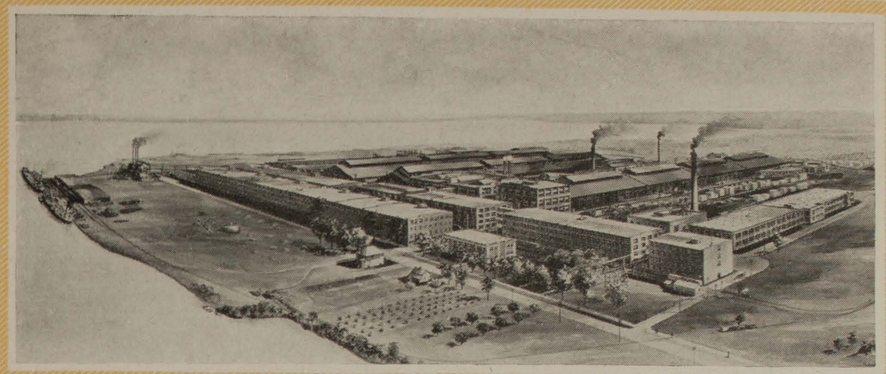
Keystone Works, Rock Falls, Ill., U S A



Twine Mills, St. Paul, Minn., U S A



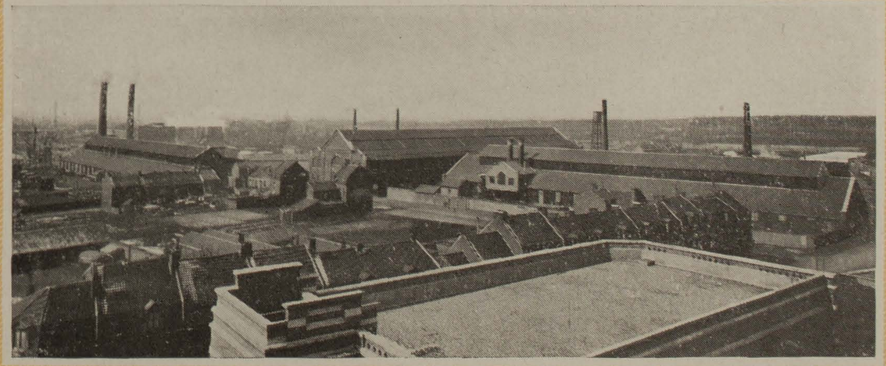
Steel Mills, South Chicago, U S A



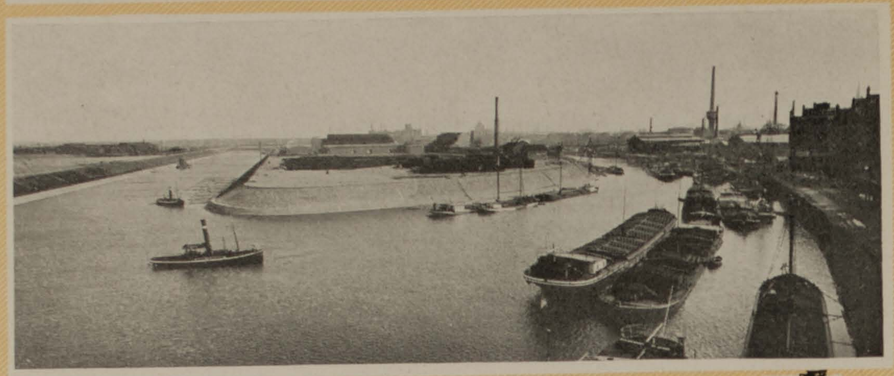
Hamilton Works, Hamilton, Ont.



Chatham Wagon Works, Chatham, Ont.



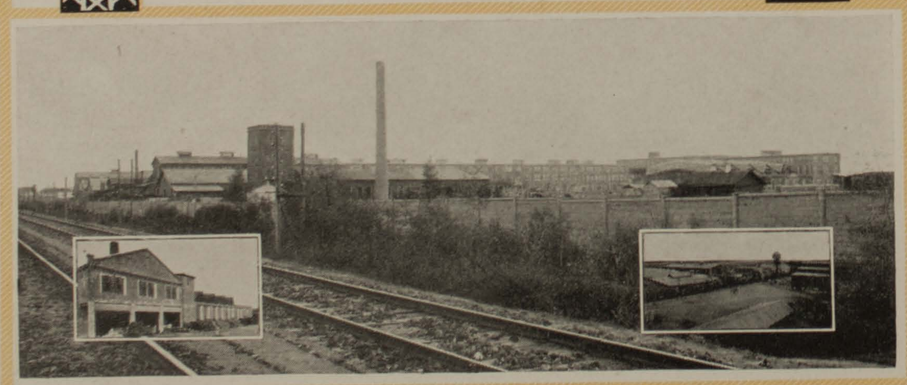
Croix Works, Croix, France



Neuss Works, Neuss, Germany



Norrköping Works, Norrköping, Sweden



Lubertzy Works, Moscow, Russia



IHC LINE

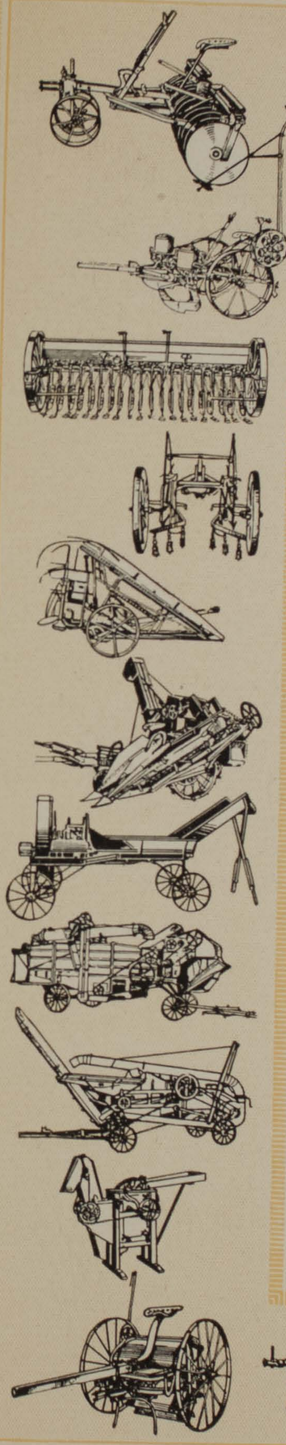
GRAIN MACHINES
- BINDERS
- HEADERS
- REAPERS
- HEADER-BINDERS

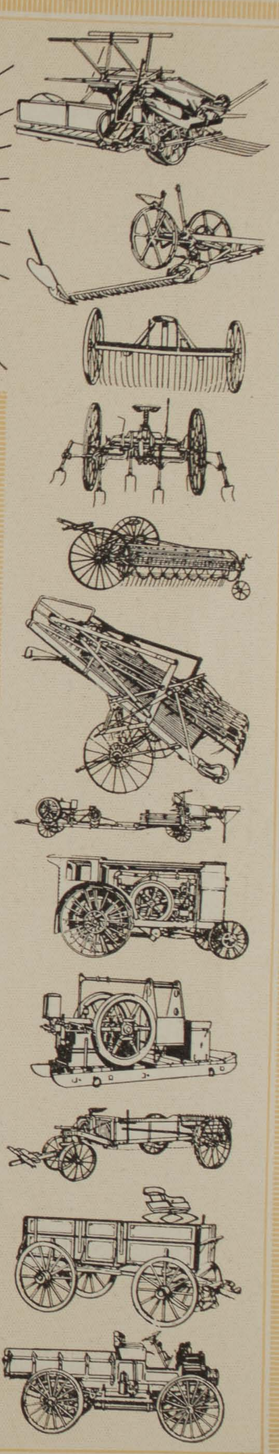
HAY MACHINES
- MOWERS
- RAKES
- HAY PRESSES
- SWEEP RAKES
- HAY LOADERS
- STACKERS
- TEDDERS
- SIDE DELIVERY RAKES
- COMBINED SWEEP RAKES AND STACKERS

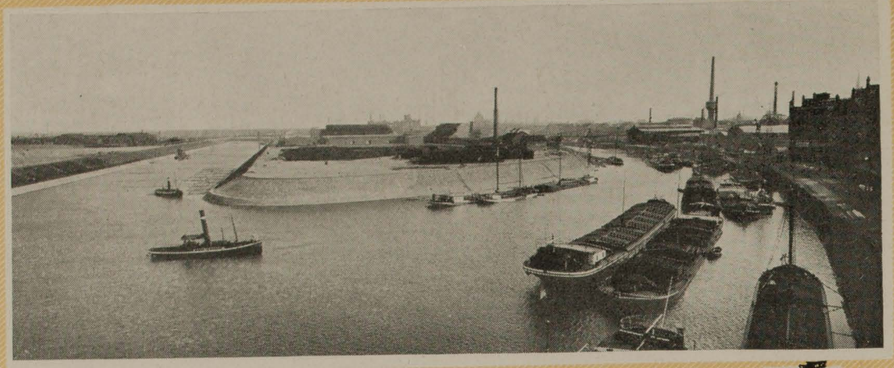
CORN MACHINES
- PLANTERS
- PICKERS
- BINDERS
- ENSILAGE CUTTERS
- CORNSTALK RAKES
- STALK CUTTERS
- SHELLERS
- CULTIVATORS
- HUSKERS AND SHREDDERS

TILLAGE
- DISK HARROWS
- CULTIVATORS
- SPRING-TOOTH HARROWS
- PEG-TOOTH HARROWS
- COMBINATION HARROWS

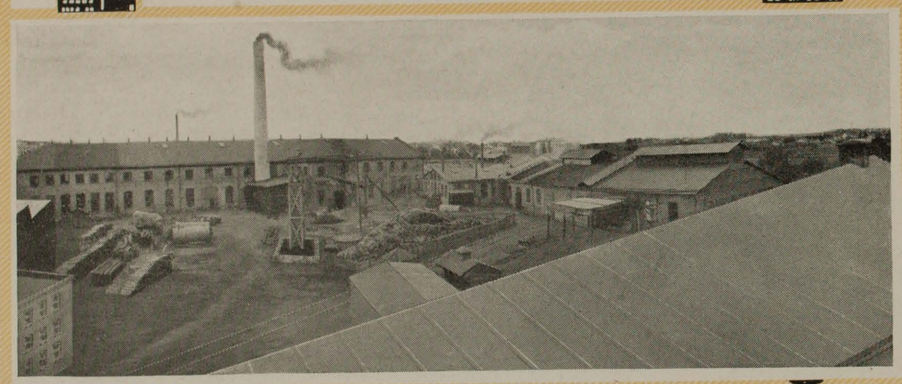
GENERAL LINE
- MOTOR TRUCKS
- FEED GRINDERS
- KNIFE GRINDERS
- BINDER TWINE
- THRESHERS
- STONE BURR MILLS
- GRAIN DRILLS
- CREAM SEPARATORS
- OIL AND GAS ENGINES
- MANURE SPREADERS
- FERTILIZER SOWERS
- OIL TRACTORS
- FARM WAGONS AND TRUCKS



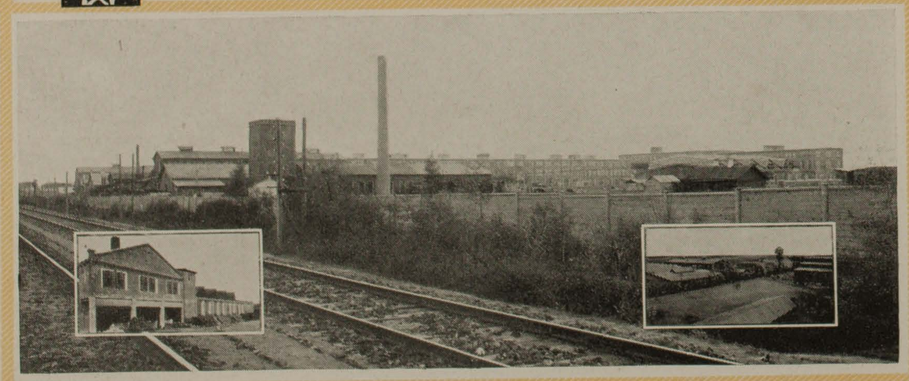




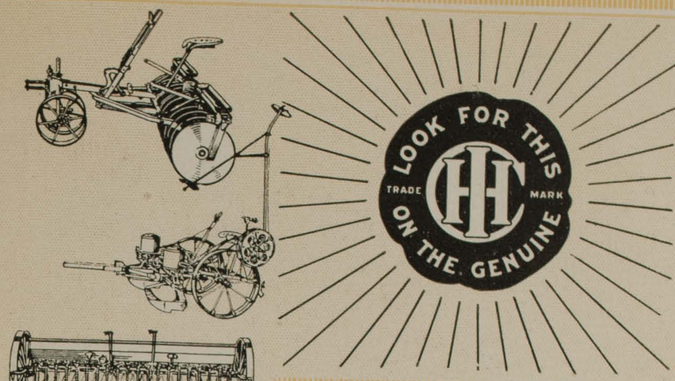
Neuss Works, Neuss, Germany



Norrköping Works, Norrköping, Sweden



Lubertzy Works, Moscow, Russia



IHC LINE

GRAIN MACHINES
- BINDERS
- HEADERS
- REAPERS
- HEADER-BINDERS

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- HAY PRESSES
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